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A HISTORY OF THE BUILDING TECHNIQUES
AND LITURGICAL USES OF THE ORGAN
IN THE CHURCHES OF BOSTON

EDNA DORINTHA PARKS

1944

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BOSTON UNIVERSITY

GRADUATE SCHOOL

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A HISTORY OF THE BUILDING TECHNIQUES
AND LITURGICAL USES OF THE ORGAN
IN THE CHURCHES OF BOSTON

by

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(Mus. B., Yale University, 1935)

submitted in partial fulfilment of the
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THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

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CHAPTER I

THE PURPOSE OF THE STUDY AND SOURCES OF DATA

The first church in colonial America to install an organ to be used permanently in the service of worship was King's Chapel, in the city of Boston. In 1860, Massachusetts claimed 50 per cent of all the organ building industry in America, and in later years, New England continued to hold the lead in value of the organs manufactured.¹ In spite of this pre-eminence in the use and construction of organs, there has been no publication or source of information available concerning Boston organs, with the exception of fifty-three pages in Miss Ayars' admirable book, Contributions to the Art of Music in America by the Music Industries of Boston 1640 to 1936.

I. THE PURPOSE OF THE STUDY

Statement of the purpose. It was the purpose of this study (1) to collect information concerning the first organs used in Boston; (2) to trace the progress of organ building through the instruments used in Boston churches; (3) to note any information concerning the liturgical use

¹Christine M. Ayars, Contributions to the Art of Music in America by the Music Industries of Boston 1640 to 1936, p. 132.

of these organs.

II. SOURCES OF DATA

Many of the large churches in Boston have prepared histories from old parish records. These have been consulted, but except for a few notable cases, the writers were evidently not interested in the musical life of the church, as little or no mention of organs was made. A study of old musical journals, old newspapers, Massachusetts Historical Collections, organ builders' catalogues, and conversations with people who had knowledge of some of the early instruments have revealed the information for the thesis. This information will not be complete, as the sources have been so scattered and inaccessible. However it is felt that a beginning will have been made in a field which has unlimited possibilities for further study and research.

CHAPTER II

METHOD OF PROCEDURE

The first organs used in Boston were imported from England. Lest it be thought that the development of the organ was largely confined to England, it is necessary to recall that the organ had been admitted to the service of the Western Church long before the instrument was even known in England. A quick survey of the predecessors of both English and American organs should afford a more thorough understanding and appreciation of the organ's growth in recent times.

Following this account has been presented a review of the first three organs used in Boston churches, and the instruments that followed them; these having been selected as characteristic examples of Boston's organs for use in the study. These brief histories, supplemented by a description of outstanding organs built and used in Boston during the past two hundred years were the bases for the conclusions reached.

CHAPTER III

A BRIEF HISTORY OF ORGAN BUILDING BEFORE 1713

The organ is a development of the first wind instrument known to man. Exactly how the first wind instrument was created is not known, but it is logical to assume that the sound made by a gentle breeze striking against the edges of a broken reed may have given man sufficient idea to make a pipe of the reed. In the beginning, these pipes or whistles would sound only one tone, but when several were bound together, they formed a rude instrument known as Pan's Pipes or the Syrx. That such instruments were actually used in Mesopotamia and Egypt is evidenced by pictures found on the walls of ancient tombs.

The reeds in these early instruments were cut just below the knot; thus air blown into the reed could not escape past the knot and was forced back through the length of the pipe, producing a tone nearly an octave lower than that of an open pipe. Thus it was that the principle of the stopped pipe was established first. The necessity of keeping the mouth in constant motion across the tubes rendered enough difficulty that some change in the pipes had to be found. A mouthpiece was made below the knot in the reed and the air was forced into the instrument from below. A straight slit was made through the knot close to the front;

The first part of the report is devoted to a description of the
- experimental apparatus and the method of measurement.
The results of the measurements are presented in the second part.
The third part contains a discussion of the results and a comparison
with the theoretical predictions. The fourth part is devoted to a
conclusion and a summary of the results. The fifth part contains
a list of references and a list of symbols. The sixth part is
a list of figures and a list of tables. The seventh part is a
list of appendices and a list of footnotes. The eighth part is
a list of references and a list of symbols. The ninth part is
a list of figures and a list of tables. The tenth part is a
list of appendices and a list of footnotes.

immediately above the slit a small horizontal opening was made with a sloping notch bevelling upward and outward over that again. The air having passed through the slit would strike the edge of the notch and produce rapid waves, which would be transferred to the air in the tube. This was the first use of the principle of the open pipe as we know it to-day. Such a series of pipes, set in a wooden box, and supplied with air by two attendants blowing into pliable tubes is sculptured under a monument in the museum at Arles and bears the date XX.M.VIII¹. It is believed that all of the pipes sounded simultaneously, unless the fingers or hands were used to silence those not wanted. To remedy this defect a slide was added. This slide was perforated to admit or exclude air as it was pulled in or out under the pipe.

While no date can be ascertained as to when these improvements were made, it is certain that the germ of many of the most important parts of the instrument had been discovered before the Christian Era.

The first instruments mentioned in the Bible were the kinnor and ougab. They were nearly always mentioned

¹ Dom Bedos, L'Art du facteur d'orgues, Paris, 1766, cited by Grove's Dictionary, vol. III, p. 736.

together, and were the only ones mentioned before the Deluge. Ougab has been translated guitar, psaltery, and organ in the Septuagint. The German version of the Bible used Pfeifer or pipes; in the Chaldee, ougab is still translated "abuba", meaning an ear of corn with the stalk or straw--by translation a pipe made of such a reed or stalk; however, the St. James translation gives a uniform rendering of ougab as organ. This rendition occurs in Genesis, Chapter 4, verse 21, "Such as handle the harp and organ." Similar translations occur in Job, Chapters 21 and 30, and in the 150th Psalm. The importance of the organ may be judged from the reference in the 150th Psalm, where all the stringed instruments are grouped as one, and the organ is isolated from other wind instruments. "Praise him with stringed instruments and organs."

An instrument called the "Hydraulus" was mentioned in De Architectura, a treatise of Vitruvius in the first century. The Pneumatica of Hero in the second century also contains a description of the instrument. Water was used as a force to convey air to a row of pipes arranged in the order of the musical scale. In 1885, a clay model of such an instrument was discovered at Carthage, and may now be seen there in the Museum of St. Louis. Descriptions of the instrument stress its size, power, and comparative

versatility. The popularity of such a mysterious and powerful instrument grew rapidly. Slaves were required to pump with all their strength to assure the steady flow of air. The Hydraulus was used in contests and as entertainment at public banquets, and even found its way into private homes. The legend that Ctesibius invented the "Hydraulus" around 300 B.C. is questionable in the light of recent research.

Regular bellows were soon substituted for water as a means of supplying steady wind pressure for the organ. A copy of an organ using air compressed by the weight of human beings has been found on an obelisk built by Theodosius (d. 393) at Constantinople. An organ having two elephants' skins and fifteen smiths' bellows has been mentioned in the fifth century A.D., and the bellows of another organ was described by King Vitigas the Goth in 1514.

By the eighth century, organ building was centered at Constantinople. These instruments used lead for the pipes, and there was the opportunity to sound more than one note at a time. Combinations of melodies were used. In singing the Plainsong melodies, the difference in range between the tenor and bass voices had given rise to singing in fourths and fifths. This vocal music was called Organum from "organa" or "organistrum", the instrument which could duplicate the effect the singers produced. Finding it

possible to play two melodies at the same time, using two hands, experiments were made using two pipes for each tongue. After it was found practical, this improvement was added to the instrument. If two pipes were added, one was a fourth or fifth above the first, and when three were added, the intervals of a fifth and octave were added. Thus two or three melodies could be played simultaneously, using only one hand and by striking only one tongue or key at a time. This new invention was called *locatio* or *mixture*.²

The use of the organ seems to have been appreciated in England and France at about the same time. In the latter country, the first organ appears to have been one sent by the Emperor of Constantinople to Pepin, the father of Charlemagne, in 757; the instrument was placed in the Church of Saint Corneille at Compiègne. The Annals of Ulster record that the organ in the Church of Clooncruff Co., Roscommon, was destroyed by fire in 814 A.D. Hence, the organ must have been introduced into Ireland at an early date and under the name of "oircin". Probably the first organ in Germany was modelled after the instrument at Compiègne, for it was made at Aix-la-Chapelle and introduced into Germany by Emperor Charles the Great in 811 or 812. It is quite apparent that the best

² For further discussion of the term Organum see Appendix A.

The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters α and β . It is shown that the system has solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied. In the case when $\alpha + \beta < 0$, the system has no solutions.

In the second part of the paper, the question of the uniqueness of the solutions of the system (1) is considered. It is shown that the system has a unique solution for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

In the third part of the paper, the question of the stability of the solutions of the system (1) is considered. It is shown that the system has stable solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

In the fourth part of the paper, the question of the asymptotic behavior of the solutions of the system (1) is considered. It is shown that the system has asymptotically stable solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

In the fifth part of the paper, the question of the bifurcation of the solutions of the system (1) is considered. It is shown that the system has bifurcating solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

In the sixth part of the paper, the question of the global behavior of the solutions of the system (1) is considered. It is shown that the system has globally stable solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

In the seventh part of the paper, the question of the periodic behavior of the solutions of the system (1) is considered. It is shown that the system has periodic solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

In the eighth part of the paper, the question of the chaotic behavior of the solutions of the system (1) is considered. It is shown that the system has chaotic solutions for all values of the parameters α and β if and only if the condition $\alpha + \beta > 0$ is satisfied.

organ builders of the ninth century were French and German, and the builders were generally the performers. These builder-performers were able to suggest many improvements from their experiences as instrumentalists.

By the tenth century, England herself had begun to build organs. One of the earliest of these was an organ built by St. Dunstan, who died in 988, and given to the Church of Malmesbury. Like many of the early English organs, this instrument seems to have had brass pipes. Copper was used for the pipes in an organ presented to the Convent at Ramsey by Count Elwin.

The invention of the mixture had been welcomed by the congregations, and by the tenth century a great number of pipes had been added to each key. Thus we read that in 951 A.D., Bishop Elphege caused to be built in Winchester Abbey, a gigantic organ, which is described in a Latin poem by Welstan,³ a Benedictine Monk, and singer in that church. Four hundred pipes and twenty-six bellows, requiring seventy strong men to blow, were only two of the features of this organ, and it required two organists. Each of the forty tongues of the organ controlled ten pipes, but as stops were not yet invented, all ten pipes spoke at once; therefore

³ Wakerbarth, Music and the Anglo-Saxons, pp. 12-15, cited by Grove, op. cit., p. 740.

nothing less than full organ could be used.

Organs were at first placed near the choirs, but as the instruments grew in size, they were moved from the choir to the west end of the church. Later, a small organ was invented which was not too cumbersome to carry. All pictures show it hung from the player's neck, and while one hand played on the keys, the other worked the bellows. This small organ was called "portative" from portare, and representations of this instrument, which could accompany the choir in processions, have been numerous in medieval paintings.

Another type of organ was developing at the same time as the portative. This later instrument was called the "positive" from ponere. It was larger than the portative, but could be moved. The instrument was placed on a table and blown from behind by an attendant. The whole thing was drawn by a cart. By the thirteenth century, then, there were three distinct types of organs developing simultaneously; the portative, the positive, and the large organ. The organ proper continued to be a rude, clumsy, instrument for many centuries. It was usually built by monks and required great physical strength to operate.

It was toward the end of the eleventh century that a keyboard similar to the keyboard of today appeared. This

keyboard was on the organ of the Cathedral at Magdeburg, and as nearly as records can determine, it was the first one of its kind. At the time of the Winchester organ and onwards, a slide had been used to admit or exclude the air from the pipes of a note. Such a slide was controlled by the tongue, which in some references has been called a key. Pressure was now substituted for traction, and huge levers were used on the Magdeburg organ to manipulate the sound. Experiments were being made with a spring-box to restore the lever to position after being knocked down.

The fourteenth century brought the next change of any importance in the building of organs. In 1361, Nicholas Faber completed the Halberstadt Cathedral organ, in which was found the first successful attempt to control the volume of sound so that it would not be a constant "full organ". Three keyboards made it possible for the front and rear pipes to sound independently, and according to an account of Praetorius, a fourth clavier was played by the feet, but the pedals may have been added later by Gregorius Kleng, who restored the instrument in 1494.

A second point of interest was the inclusion of five chromatic semi-tones on two of the three manuals. On the two upper manuals were found the B flat that had been used in the Winchester organ in the tenth century; the F# which had been

The first of these is the fact that the system is not self-sufficient. It is necessary to import a large quantity of raw materials and components from abroad. This is due to the fact that the country's resources are limited. The second point is that the system is not very flexible. It is not able to adapt to changes in the market or in the technology. The third point is that the system is not very efficient. It is not able to produce goods at a low cost. The fourth point is that the system is not very reliable. It is not able to produce goods of a high quality. The fifth point is that the system is not very safe. It is not able to protect the country's interests.

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added to the clavier in the early fourteenth century; and the C#, E flat, and G# which had been added later in that order. The manuals had a compass of scarcely three octaves, having twenty-two keys, eight of them chromatic. The range was from B up to A.

As time went on, the contrast between forte and piano which was introduced on the Halberstadt organ between two manuals, led to attempts to produce the same effect on one manual. Praetorius claims that Timotheus, a German living in the fifteenth century, was the first to construct several single sets of pipes, later called stops, on the Hintersatz of an organ he rebuilt for the monastery of the Bishop's palace at Würzburg. A "spring-box" was used to isolate the sets of pipes which were to sound alone. An iron lever in the side of the organ, called a register, could be raised or lowered, and thus opened or closed a series of spring-boxes under the pipes. By this means the wind could be prevented from opening some sets of pipes and leave the rest to be sounded alone if desired. Slider action was also used to perform the same task. This had been used by Hero and Vitruvius, but apparently the secret had been lost.

Also in the fifteenth century, names began to be used for the separate sets of pipes, for example: principal (Open Diapason, 8 feet); Octave (Principal, 4 feet); Quint

The first of these is the fact that the
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pound sterling and a consequent
fall in its value.

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employment. This has led to a
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inflation. This has led to a
loss of confidence in the
pound sterling and a consequent
fall in its value.

The fourth is the fact that the
government has been unable to
maintain a stable level of
interest rates. This has led to a
loss of confidence in the
pound sterling and a consequent
fall in its value.

The fifth is the fact that the
government has been unable to
maintain a stable level of
taxation. This has led to a
loss of confidence in the
pound sterling and a consequent
fall in its value.

(Twelfth, 2 2/3 feet); Super-octave (Fifteenth, 2 feet). Each separate series was then called a Register (Stop).

It was at this time that modifications were made in the pipe work which had been all open, metal, cylindrical and of full proportionate scale. Men began to experiment with shape, material and proportion of the pipes. Stopped pipes made of wood were used and brought forth a pleasing soft tone. Reed stops were also invented and we now find the Posaune (Trombone), Trumpet, Vox Humana. Cylindrical pipes of small diameter brought forth the string tone and so began to be built an organ containing many tone colors.

During the fifteenth century progress was made in the reduction of the size of keys. Chromatics were placed about as they are today; the size of naturals was also altered. Letters were used on the keys, but as the formation of the keyboard became compact and well defined, this custom was not followed. The naturals were black at this time and the chromatics white, a practice which was carried out until the end of the eighteenth century.

In regard to the date of the construction of the first pedal stop, the following is quoted from the Leipzig Allgem. Mus. Zeitung for 1836 (p. 128):⁴

⁴ Cited by Grove, op. cit., p. 745.

In the year 1818 a new organ was erected in the Church of Beeskow, five miles from Frankfort on the Oder, on which occasion the organ builder, Marx, senior, took some pains to ascertain the age of the old organ which he had to remove. On a careful investigation it appeared that the old organ had been built just four hundred years, the date MCCCCXVIII being engraved on the upper side of the partition (kern) of the two principal pedal pipes, for that these two pipes did belong to the pedal was clear from their admeasurement.

There seems to be some doubt about the men who were responsible for the improvements on the pedals. Ludwig van Vaelbeke in Brabant was the first to mention treading in the manner that men nowadays practice. A passage from a Flemish chronicle of 1319-1350 and quoted by R. Schlecte in his *Geschichte der Kirchen Musik*, 1817, (p. 103) indicates that the pedals were invented by van Vaelbeke (d. 1312). Traxdorff of Mainz has been mentioned because of an organ he built for the Nuremburg Church of St. Sebald in 1468-1469. Bernhard, a German organist, added pedals to his organ in St. Mark's in Venice in 1470 or 1471 and by some has been named as the inventor of pedals. If there were pedals in 1418 this obviously could not be true, but these later men must have contributed to the "introduction of semi-tones; the formation of the frame pedal board as now made; the substitution of rollers for the rope action when the breadth of the manual keys was made less than that of the pedals; the separation of the 32 foot stop from the manual, and its

appropriation, together with that of other registers, exclusively to the use of the pedals."⁵

At the beginning of the sixteenth century wooden frames for the bellows were invented. This brought the leather folds under control, increasing their durability, and also providing a more steady pressure. Hans Lobsinger of Nuremburg is said to have been the inventor of the wooden frame. Lead and stone weights were substituted for the changeable weight of human beings, and when it was found that stone absorbed too much moisture, bricks took the place of stone.

The tremulant was also a sixteenth century invention. This was made by placing a spring valve in the wind trunk, which allowed the wind to escape in puffs, thus making fluctuations in the pitch of the pipe.

In France the building of organs flourished from 1575-1650, paradoxically, as a result of the restoration of organs destroyed by the Huguenots. When the work of restoration was carried out, definite rules were followed for the distribution of stops in the tonal plan; chorus reeds were organized; the pedal organ took shape; the 32 ft. diapason was dropped from specifications and the 16 ft. and 8 ft. principals or diapasons used as foundation stops. The

⁵ Grove, op. cit., p. 746.

1. The first part of the report deals with the general situation of the country and the progress of the work during the year. It is divided into two main sections: the first section deals with the general situation of the country and the progress of the work during the year, and the second section deals with the specific results of the work.

2. The second part of the report deals with the specific results of the work. It is divided into three main sections: the first section deals with the results of the work in the field of agriculture, the second section deals with the results of the work in the field of industry, and the third section deals with the results of the work in the field of commerce.

3. The third part of the report deals with the conclusions and recommendations. It is divided into two main sections: the first section deals with the conclusions and the second section deals with the recommendations.

4. The fourth part of the report deals with the appendix. It contains the following information:

- a. A list of the names of the members of the committee.
- b. A list of the names of the members of the sub-committee.
- c. A list of the names of the members of the working group.
- d. A list of the names of the members of the advisory committee.
- e. A list of the names of the members of the executive committee.
- f. A list of the names of the members of the secretariat.
- g. A list of the names of the members of the administrative staff.
- h. A list of the names of the members of the technical staff.
- i. A list of the names of the members of the financial staff.
- j. A list of the names of the members of the legal staff.
- k. A list of the names of the members of the medical staff.
- l. A list of the names of the members of the educational staff.
- m. A list of the names of the members of the cultural staff.
- n. A list of the names of the members of the sports staff.
- o. A list of the names of the members of the social staff.
- p. A list of the names of the members of the religious staff.
- q. A list of the names of the members of the political staff.
- r. A list of the names of the members of the military staff.
- s. A list of the names of the members of the naval staff.
- t. A list of the names of the members of the air staff.
- u. A list of the names of the members of the land staff.
- v. A list of the names of the members of the marine staff.
- w. A list of the names of the members of the coast guard staff.
- x. A list of the names of the members of the customs staff.
- y. A list of the names of the members of the immigration staff.
- z. A list of the names of the members of the passport staff.

fourniture, a stop of two to eight ranks starting at 2 ft., or 1 ft. C, was finished by the cymbale in the high range, so the "chorus" of the seventeenth century in France was usually diapason, 16 ft., 8 ft., 2 ft., furniture and cymbale. "In this the builders achieved a fine balance of sonority never since surpassed, affording the maximum of clarity, volume and carrying power."⁶ The trompette, made with a leaden block and a brass reed, was most popular. Added to the reed chorus was the clarion 4 ft., and bombarde 16 ft. All the reeds were on a special wind pressure.

There were many one manual organs, but for fifteen stops or more there were usually two manuals. The pedal organ was independent and occasionally based on a 16 ft. or 12 ft. rank and also included an 8 ft. flue and 8 ft. reed. Manuals were enlarged to forty-five to forty-nine notes, but the lowest octave was usually short. The pedal board averaged ten to seventeen keys; and in 1619, the organ at Nantes had thirty notes to be used by the feet. The slide chest was being used in place of the old-fashioned spring box.

French organ building seems to have reached a high point about the beginning of the eighteenth century, and

⁶ Nobert Dufourcq, L'Orgue en France du XIII^e e au XVIII^e e siècle, reviewed by Seth Bingham, The Diapason, 28 yr., No. 2, p. 20, January 1, 1937.

there were but few improvements added or progress made in development during the century itself. It is evident that most of the pipe work and mechanism of seventeenth century organs had vanished before this time.

German and Dutch organ builders took the lead in the seventeenth century and probably constituted the most important school of building until 1780. Their instruments were always large and included a powerful pedal organ with many independent stops. The organ at Antwerp in the Church of St. Paul was built in 1670 and contained fifty-one stops on three manuals and pedals. Cologne, Strasbourg, Waterhausen, all had fine examples of seventeenth and eighteenth century organs. Hamburg organs became quite famous and we read, "Bach was perfectly happy with the organ at St. Catherine's with its four manuals and pedal."⁷

That these large organs were difficult to construct is shown by the use of the ventils to shut off the air from various sections of the organ while the performer was preparing the stops. The sliders could not be made accurate enough to stop the escape of air, and dampness would add to the difficulties by making the sliders swell and stick. The ventils remedied these defects after a fashion.

⁷ Philipp Spitta, Life of Bach, Vol. ii, p. 18.

Practically all of the old instruments were built with the key chamber type of chest. The great virtue of this type of wind chest lies in the fact that one tone of all the pipes drawn will sound simultaneously from the same chest and consequently they are on exactly the same even pressure tending to find an even balance of tonal blending . . .

Another principle in organ building used in Bach's time, which is no longer considered, is the actual building of the organ in the locale where it is to be used.⁸

Equal temperament tuning made headway faster in Germany than in the other countries, and was accepted there first. The pedals on these early German organs were very inconvenient. They were so short during Bach's early days that playing with the heel was impossible; the sharps were both high and finished with a projection which very easily would catch the toe of the player. Stop handlers were also inconveniently placed. At the old Nicolai organ in Leipzig, the organist was forced to leave his seat to reach some of them.

Late in the seventeenth century in Germany was produced the "Baroque" organ, taking its name from the prevailing period of German architecture. Gottfried Silbermann was the most famous builder of this type of organ. His organ was operated on a $2\frac{1}{2}$ inch wind pressure and was

⁸ Albert Riemenschneider, Bach's Organ Music in Light of a Study of Organs of His Day, The Diapason, 32nd yr., No. 3; p. 6; February 1, 1941.

constructed with a complete set of harmonic corroborating stops on each manual. A Silbermann ensemble in ascending from bass to treble reached its maximum brilliance at about f2 or g2 and from there on became milder as it went up. This was quite contrary from the French style of voicing which aimed at a continuous crescendo up to the final note of the gamut.

With the eighteenth century, the history of the organ was no longer so confined to the continent, but rather it reverted to English builders, who so far, had failed to equal the instruments of the continent either in size or variety of tone color. It was due largely to the skill of England's famous organists during the sixteenth and seventeenth centuries that attention began to be paid to the instrument and improvements began to be made.

The earliest specifications known to exist in England were for the "Payer of organs" for the P'isshe of Alhalowe, Barkyng, next ye Tower of London, dated 1519. This organ incorporated the invention of stops and the sound board from the continent and was built by Anthony Duddyngton. It doubtless had the four-octave short octave range, a system which was characteristic of the English organ until the early nineteenth century. Two natural keys were omitted in the lowest octave, making twenty-seven natural keys instead of twenty-nine in the four octaves. CC was on the EE key, making

The first part of the paper is devoted to a discussion of the
general principles of the theory of the structure of the
crystal lattice. It is shown that the structure of the
crystal lattice is determined by the arrangement of the
atoms in space. The arrangement of the atoms is
determined by the forces of attraction and repulsion
between them. The forces of attraction are due to the
electrostatic interaction between the positive and
negative ions. The forces of repulsion are due to the
overlap of the electron shells of the atoms.

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properties of the crystal lattice. It is shown that the
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the succession CC, FF, G, A, B, C. The DD was found on the FF# key, EE on the G# key, and Bb. If the lowest octave was complete EEb was present; DD was in its rightful position and AA was on the CC# key. GG short octaves were made by adding a key beyond CC which sounded the GG. The FFF short octave may have had that note sounded from the AA long key.

Many organs were destroyed through the enforcement of the Ordinance of 1643, but upon the restoration of Charles II, in 1660, the organs began to be replaced. Workers who were skilled in organ building were scarce now, so builders were urged to come from the Continent. Bernhard Schmidt, a German later known as "Father Smith", came at this time. John Harris and his son, Renatus, came back from France where they had been carrying on their work when driven from England. Two other German builders came to England during the eighteenth century, Paul Michlan and John Snetzler.

The organs built at this time usually had two or three manuals but no pedals. The most powerful stops were controlled by the Great manual and was the large organ previously described. The Positive was acted on by the second keyboard. Both organs were placed on the screen in the position formerly occupied by the Rood. The Positive was made to face the choir and later became known as the Choir organ, the keyboard controlling it, the Choir keyboard. If there was a third

The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) and (2) for arbitrary values of the parameters α and β . It is shown that the system has solutions for all values of α and β if and only if the conditions (3) are satisfied. The second part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (4) are satisfied. The third part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (5) are satisfied. The fourth part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (6) are satisfied. The fifth part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (7) are satisfied. The sixth part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (8) are satisfied. The seventh part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (9) are satisfied. The eighth part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (10) are satisfied. The ninth part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (11) are satisfied. The tenth part of the paper is devoted to the study of the properties of the solutions of the system (1) and (2) for arbitrary values of the parameters α and β . It is shown that the solutions of the system (1) and (2) are unique for all values of α and β if and only if the conditions (12) are satisfied.

manual, it acted on an "Echo" organ in which the pipes were small and enclosed in a box to make them sound as if played in the distance.

The front of the echo box was provided with a sliding shutter in 1712 by Abraham Jordan. This shutter was opened or closed by a rope attached to a pedal thus making it possible to produce a louder or softer effect. It was advertised in the Spectator of February 8, 1712,

Whereas Mr. Abraham Jordan, senior and junior, have with their own hands, joinery excepted, made and erected a very large organ in St. Magnus's Church, at the foot of London Bridge, consisting of four sets of keys, one of which is adapted to the art of emitting sounds by swelling the notes, which never was in any organ before: this instrument will be publicly opened on Sunday next, the performance by Mr. John Robinson. The above said Abraham Jordan gives notice to all masters and performers that he will attend every day next week at the said church to accommodate all those gentlemen who shall have a curiosity to hear it.

The new invention found great favour in England although not accepted on the Continent until much later. The "Swelling Organ" took the place of the Echo Organ and its keyboard became known as the Swell Manual.

The Concussion bellows to keep the pressure steady; the wind gauge, being a glass tube, U shaped, and measuring the wind pressure by the distance that the pressure drives water up one arm of the U; composition pedals by which some stops can be drawn others pushed in by a double action pedal; horizontal bellows with a square reservoir; wooden ribs

The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations

which are satisfied by the functions $u(x, y, z)$ and $v(x, y, z)$ in the domain D of the space E_3 . It is shown that the system of equations is solvable in the domain D if and only if the functions $f(x, y, z)$ and $g(x, y, z)$ satisfy certain conditions. These conditions are expressed in terms of the integrals of the functions f and g over the domain D .

In the second part of the paper the problem of the existence of solutions of the system of equations is solved for the case when the functions f and g are continuous and satisfy the conditions of the first part. It is shown that the system of equations is solvable in the domain D if and only if the functions f and g satisfy certain conditions. These conditions are expressed in terms of the integrals of the functions f and g over the domain D .

In the third part of the paper the problem of the existence of solutions of the system of equations is solved for the case when the functions f and g are continuous and satisfy the conditions of the first part. It is shown that the system of equations is solvable in the domain D if and only if the functions f and g satisfy certain conditions. These conditions are expressed in terms of the integrals of the functions f and g over the domain D .

In the fourth part of the paper the problem of the existence of solutions of the system of equations is solved for the case when the functions f and g are continuous and satisfy the conditions of the first part. It is shown that the system of equations is solvable in the domain D if and only if the functions f and g satisfy certain conditions. These conditions are expressed in terms of the integrals of the functions f and g over the domain D .

In the fifth part of the paper the problem of the existence of solutions of the system of equations is solved for the case when the functions f and g are continuous and satisfy the conditions of the first part. It is shown that the system of equations is solvable in the domain D if and only if the functions f and g satisfy certain conditions. These conditions are expressed in terms of the integrals of the functions f and g over the domain D .

In the sixth part of the paper the problem of the existence of solutions of the system of equations is solved for the case when the functions f and g are continuous and satisfy the conditions of the first part. It is shown that the system of equations is solvable in the domain D if and only if the functions f and g satisfy certain conditions. These conditions are expressed in terms of the integrals of the functions f and g over the domain D .

instead of leather folds in the bellows; inward and outward working ribs; all were English inventions of this period.

With this picture of organ building at the end of the eighteenth century in England, and with the English organs the immediate fore-runners of the organs in Boston, we may conclude this brief survey of the development of the organ since early times and proceed to the more immediate topic of the organ in Boston.

CHAPTER IV

THE ORGANS AT KING'S CHAPEL 1714 TO 1944

The first organ at King's Chapel, which claims the honor of being the first organ installed for permanent use in the North American Colonies, also was the first organ to be imported in New England. It was brought to Boston for Mr. Thomas Brattle. In all books referring to this organ, the date of its entry into this country has been set as not later than 1711. This date had been found in the diary of the Reverend Joseph Green of Salem Village, with the following notation: "May 29, 1711: I was at Mr. Thomas Brattle's; heard ye Organs and saw strange things in a microscope."¹

However, the organ must have been imported at least three years earlier, as the following reference from the Sewall Papers mentions the same organ with the date September 3, 1708. In speaking of attending a funeral in Cambridge, Mr. Sewall wrote, "I used to go to the same Room for the Sound of Mr. Brattle's Organs."² Obviously then the organ was in this country before 1708. Further research may place this first Boston organ closer in date to the organ now

¹ Essex Institute Collections, 1869, cited by Henry W. Foote, Three Centuries of American Hymnody, p. 80.

² Massachusetts Historical Collections, Fifth Series, VI, Sewall Papers, Vol. II, p. 235.

THE [illegible]

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claimed to be the first in America.

In 1703 an organ was loaned to Gloria Dei Church in Philadelphia for the ordination service of Justus Falckner. The actual date of its importation is not known, nor is the claim of an organ at Port Royal, Virginia in 1700 substantially proved.³

After Mr. Brattle's death his organ was given to King's Chapel but not without some discussion and religious dissention. The Reverend F. W. P. Greenwood's History of King's Chapel⁴ written in 1813 stated that the organ had not been intended for King's Chapel but bequeathed by Mr. Brattle as follows:

I give, dedicate and devote my organ to the praise and glory of God in the sd Church (in Brattle Square) if they shall accept thereof; and within a year after my decease procure a sober person that can play skillfully thereon with a loud noise. Otherwise to ye Church of England in this town, on ye same terms.

Mr. Greenwood further states that:

On July 24, 1713 the Brattle Square Church declined the organ as being improper to use in the public worship of God. The organ was then offered to King's Chapel and on August 3, 1713, it was accepted by that Church. A few days later, the organ was brought to the church, but due to the scruples of some of the members it was not set up until seven months later. In March, 1714, it was installed in the west gallery.

A Mr. Price was engaged to be the organist. Whether

³ Henry W. Foote, op. cit., pp. 81-82.

⁴ Everett Truette Collection VII, p. 162.

he was not sober enough or whether he could not play with a loud enough noise was not stated, but he was replaced by Mr. Edward Enstone from England about Christmas, 1714.

The Annals of King's Chapel (Vol. iii, p. 126) stated that the organ was built by Bridge of London. Miss Ayars claimed it was built by Smith, Harris and Jordan of England. These three men were separate builders and not one concern. Miss Ayars also says:

The one manual had a DD to e compass. The only proved original stops were Stopped Diapason, 8 ft., and Fifteenth, 2 ft. The Principal 4 ft., Sesquialtera III R and Dulciana 8 ft. (Ten. G) may have been added later. The wooden pipes were of oak and the organ had brass pallet springs (under the valves).⁵

Miss Ayars cited as her authority for at least part of her statement, Henry A. Goodrich, Church Organs, p. 5. The information could not be found there.

The most authoritative information about the organ came from Mr. Robert B. Buxton of Exeter, New Hampshire.

Previous to the winter of 1933 the last known work done on the Brattle organ was by George Tucker, an organ builder who died about three years ago. Mr. Tucker pasted the following note in the bottom of the wind chest of the old organ:

⁵ Christine M. Ayars, op. cit., pp. 140-41.

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George Tucker
Church Organ Builder
Voicer and Tuner

Ocean Spray, Winthrop, Mass.
May, 1908

This organ Built by Bridge of London, Eng. about 200 years ago has been altered somewhat by various people the original 2 rank Mixture was replaced by a Fid g Dulciana of poor material.

I took the table off the bars and refitted it up a fresh rounded of the metal pipes and repaired the wood pipes and revoiced the whole to the order of
Mr. Charles C. Hall, Church Warden

(signed) George Tucker

At that time, as far as I can ascertain, the organ was in St. John's parish house on State Street, Portsmouth, N. H. From the condition of the organ as I found it, and what members of the church told me, a smoke pipe from a stove passed over the organ, and tar dripped down into the organ from a joint in the pipe. The organ was removed to the west gallery of St. John's Church about 1914, and stored there.

I first visited the organ in June 1933 with Messrs. Herbert H. Foss, Senior Warden, and Harold Littlefield, Junior Warden of St. John's Church. We opened up the case, and found a horrible mess. Not a single pipe stood on the sound board. The pipes and parts appeared to have been thrown in promiscuously, and all were covered deep with dust. We discussed the matter of restoration, and as the church was unable to finance it, I did it without charge to save this . . . historical instrument.

Nothing except the dust was thrown away . . .

Originally the organ had three ranks of metal pipes -- a Sesquialtera mixture of two ranks (98 pipes) and a Fifteenth of 49 pipes. Only 20 metal pipes were found, and these were mostly mutilated to a point where repairs can only be made when I can make special mandrels, unsolder the pipes and straighten them. There are about 5 Dulciana pipes and fifteen Fifteenth pipes from the

THE HISTORY OF THE CITY OF BOSTON

FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME

BY
JOHN HUTCHINGS

IN TWO VOLUMES.
THE FIRST VOLUME.
FROM THE FIRST SETTLEMENT
TO THE YEAR 1700.

NEW-YORK:
PRINTED BY J. M. GILBERT,

AT THE NEW-YORK OFFICE OF THE
PUBLISHERS, 10 NASSAU ST. (CORNER
OF WALL ST.) 1854.
THE SECOND VOLUME.
FROM THE YEAR 1700
TO THE PRESENT TIME.

PRINTED BY J. M. GILBERT,
AT THE NEW-YORK OFFICE OF THE
PUBLISHERS, 10 NASSAU ST. (CORNER
OF WALL ST.) 1854.
THE THIRD VOLUME.
FROM THE YEAR 1700
TO THE PRESENT TIME.

... THE HISTORY OF THE CITY OF BOSTON ...

... THE HISTORY OF THE CITY OF BOSTON ...
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... THE HISTORY OF THE CITY OF BOSTON ...

organ as I found it. These I have placed in a special rack inside the organ case; so that they are preserved with the organ, although they cannot now be played.

Of the wooden pipes, all but three were found. The wooden Principal 4' was complete, the Stopped Diapason lacked three pipes near the top end. I made three wood pipes to match completing the set. (The pipes were hand-made in the church and match into the set perfectly except in appearance.) Many of the wooden pipes were cracked, had caps missing, or were filled up with tar. I found all the missing parts, glued up cracks, cleaned out the tar, and made all the pipes speak correctly. There is no doubt, from the appearance of the pipes, that except for the three pipes I made, all of the wooden pipes in the Brattle organ, are the original. Most of the pipes are in fine condition.

The Stopped Diapason pipes have small holes bored through the stoppers. I doubt if these holes were there originally. The purpose was evidently to brighten up the tone (the hole acts as a chimney; so it is now in effect a Röhrlute). The boring begins at Tenor G.

In order to have the organ sound something like it did in olden times, the wardens bought two used sets of pipes from Jerome B. Meyer and Sons Co., Milwaukee, Wis., -- a 49 note Fifteenth and a 31 note Dulciana (from Tenor F# up). These were voiced and regulated as well as possible, considering the unstable wind condition in the organ.

The pipe rack was broken; but I was able to repair it so that it is quite strong. From the appearance it is the original. Holes for the Sesquialtera Mixture are still there, although partly taken over by the Dulciana. Likewise the rack pins, that support the rack were all found -- two or three appear to be of a much later date than the others.

The sounding-board, or table, was in good condition, and except for a few cracks, required no work, also the slides. There was a crack along the back of the Chest over the sound bars, causing two or three notes to speak to-gether -- this I fixed by gluing and clamping.

The first of these is the fact that the
 system is not a simple one, but a complex one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.

The second of these is the fact that the
 system is not a static one, but a dynamic one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.
 The third of these is the fact that the
 system is not a closed one, but an open one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.

The fourth of these is the fact that the
 system is not a simple one, but a complex one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.

The fifth of these is the fact that the
 system is not a static one, but a dynamic one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.

The sixth of these is the fact that the
 system is not a closed one, but an open one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.

The seventh of these is the fact that the
 system is not a simple one, but a complex one.
 It is a system of many parts, each of which
 is itself a system of many parts, and so on.

All the valves were in good condition. Four or five valves were missing, and all leather nuts had to be replaced.

The bellows, foot-treadle, etc. were leaking somewhat. I oiled up the leather, patched it where broken, and tightened up the joints in the wind trunk. After trying out various pressures, I decided that $2\frac{1}{2}$ " (water column) was the one the old pipes had been voiced on; so that is the way the organ stands to-day.

The key-board and draw-knobs were in fair shape. I had some very old ivory and replaced two missing keys ivories. . . . One draw-knob was split off on one side; so I glued on a piece of mahogany, and turned the splice down to shape, finishing it by hand so that none of the old original wood was cut away. . . .

Tonally the organ leaves much to be desired, based on our modern conception of an organ. Worst of all is the wind supply. The reservoir is very small about 6 cu. ft. capacity, and one stroke of the feeder sends it up about 2". The result is that when the organ is being played every stroke of the pumping treadle shakes the tone. About the only way it can be played at all well is to pump one stroke of the treadle for each beat of the measure. . . . I doubt if the organ was ever any better in that respect than it is now. On steady wind pressure the old pipes have a very lovely soft tone. The organ will not support a congregation of any size.

I do not believe the present case is over 100 years old. I have heard that the original case is still extant, but have been unable to trace it. From the appearance, and the tradition that the organ was rebuilt when brought to Portsmouth about 1836, I think that the present case was built about that time. The wind chest looks fairly new, and may have been remade at the same time, and probably the bellows have been releathered several times, although there is a possibility that the wood in them and the wind trunk is original.

The sounding board and pipe rack are undoubtedly original. Also the Principal 4', and most of the pipes of the Stopped Diapason. Of the few metal pipes that

1. The first part of the paper is devoted to a general discussion of the problem.

2. In the second part, we consider the case of a single particle.

3. The third part is devoted to the case of a system of particles.

4. In the fourth part, we consider the case of a system of particles with interactions.

5. The fifth part is devoted to the case of a system of particles with interactions and a magnetic field.

6. The sixth part is devoted to the case of a system of particles with interactions and a magnetic field.

remain several are probably original.⁶

Mr. Buxton also supplied the information that the organ was played at a service of Morning Prayer on September 24th, 1933. Mr. Buxton was the organist and played Gott, heiliger Grist, J. S. Bach, and for the postlude, Fuga Obligata, von Blankenburg (about 1710). The organ had been tuned to the large church organ, and the hymn tunes were given out on the Brattle organ, then both organs used for the singing.

Mr. Buxton, after careful research and questioning of many people connected with the parish of St. John's, concluded that contrary to many stories now being told, the organ was not playable after about 1910 until its restoration in 1933.

The organ was moved in 1933 from the gallery to the main floor, and now stands in the north west corner of the church, behind the Vinegar Bible.

The sound-board and rack boards being original, and being bored for five ranks of pipes must prove the number of original stops. Mr. Buxton believes that these stops were Stopped Diapason 8', Principal 4', Fifteenth 2' and Sesquialtera mixture of 2 ranks.

⁶ Copied from first draft of a report to the wardens of St. John's Church, Portsmouth, made by Robert B. Buxton upon completion of the restoration of the organ in 1933.

After the removal of the first organ from King's Chapel in 1756, at which time it was purchased by St. Paul's Church in Newburyport where it was used for eighty years and then sold to St. John's Church in Portsmouth, New Hampshire, for \$450, a new organ was procured from England. Mention of it was made in the Boston Gazette and Country Journal of the 30th of August, 1756.

We hear that the organ, which lately arrived from London by Captain Farr for King's Chapel will be opened on Thursday next in the afternoon; and that said organ (which contains a variety of curious stops never yet heard in these parts) is esteemed by the most eminent masters in England to be equal if not superior to any of the same size in Europe. Tradition says that Handel was one of the "masters".

The organ had been designed in London by Adam Smith. There was no pedal board on the instrument and the keyboard was made in the style of the day, having the long flat keys black, and the short raised keys white. The complete specifications have not been found but it was known to possess the following stops:

16'	Contra Diapason	56 pipes
8'	Stopped Diapason	56 pipes
8'	Open Diapason	56 pipes
4'	Flute d'Amour	56 pipes
2 2/3'	Twelfth	56 pipes
2'	Fifteenth	56 pipes
4 Rks.	Mixture	224 pipes

3 Rks. Mixture	168 pipes
8' Trumpet	56 pipes
4' Clarion	56 pipes

Sub-bass pipes were added to this instrument in 1824⁷ and double bellows put in place of the smith's bellows. This work was probably done by Mr. Goodrich. Further repairs were made in 1844.

Simmons and Willcox installed the next organ at King's Chapel from a specification prepared by F. C. Loring, Esq. This work was completed on April 14, 1860. The case of the Smith organ and some of its stops were retained. The new organ had three manuals of 56 notes, extending from C 8 ft. to g 3. The color of the keys was made to conform with the system used to-day. The long keys were now white, and the short raised keys, black. The specifications were as follows, with the asterisk indicating stops incorporated from the 1755 organ:

Great Manual

* 16'	Contra Diapason	56 pipes
8'	Open Diapason	56 pipes
* 8'	Stopped Diapason	56 pipes
8'	Hohl Flote	56 pipes
8'	Viola Da Gamba	56 pipes
5 1/3'	Quint	56 pipes
4'	Octave	56 pipes

⁷ George Hedrick, Old Churches and Old Organs, Lowell Vox Populi, cited in Annals of King's Chapel, Vol. I, p. 215, gave 1825 for this date.

	4'	Flute Octavante	56 pipes
*	2 2/3'	Twelfth	56 pipes
*	2'	Fifteenth	56 pipes
*	4 Rks.	Mixture	224 pipes
	8'	Trumpet	56 pipes

Swell Manual

		Bourdon Bass	
	16'	Bourdon Treble	56 pipes
*	8'	Open Diapason	56 pipes
	8'	Stopped Diapason	56 pipes
	8'	Viol d'Amour	56 pipes
	4'	Octave	56 pipes
	4'	Flute Harmonique	56 pipes
*	3 Rks.	Mixture	168 pipes
	16'	Contra Trumpet	44 pipes
*	8'	Trumpet	56 pipes
	8'	Oboe	56 pipes
*	4'	Clarion	56 pipes

Choir Manual

	16'	Aeolina	56 pipes
	8'	Dulciana	56 pipes
	8'	Keraulophon	56 pipes
*	8'	Stopped Diapason	56 pipes
	4'	Dolce	56 pipes
*	4'	Flute d'Amour	56 pipes
	2 Rks.	Mixture	112 pipes
	8'	Corno di Bassetto	56 pipes
	16'	Contra Fagotto	44 pipes

Pedal

	16'	Open Bass	27 pipes
	16'	Bourdon Bass	27 pipes
10	2 2/3'	Quint Bass	27 pipes
	8'	Violoncello Bass	27 pipes
	16'	Posaune Bass	27 pipes

Remodeling was done again in 1884 by Messrs. Hook and Hastings. The instrument was practically rebuilt at that time, but as many as possible of the old pipes were retained

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The following table shows the results of the experiments conducted on the 1000 subjects.
 The results show that the subjects were able to perform the task with a high degree of accuracy.
 The results also show that the subjects were able to perform the task with a high degree of speed.

and the old oaken casing, with the crown and mitre, was allowed to remain as it originally stood. There was a 30 key pedal board at this time. An echo organ was added to this by Hook and Hastings in 1892. It was set in the attic and evidently did not function too successfully at that time, for Mr. Lang, organist at the Chapel, and possessing a sense of humor, caused the following card to be engraved and attached to the motor box: "Please do not use the Echo organ, as it is either out of order or about to become so."⁸ A tubular pneumatic system was used for the connections. An electric motor was added in 1907.

The present organ was built by the Ernest M. Skinner Co. in 1910 in memory of the son of Mr. Frank Everett Peabody. A larger case was made in imitation of the old one, and the original crown and mitres again incorporated in the design. Electro-pneumatic action was used.

Specifications for King's Chapel Organ

Ernest M. Skinner Co.

Compass of Manuals from C to C⁴ -- 61 notes

Compass of Pedals from C to f¹ -- 30 notes

Great Organ

16'	Diapason
16'	Bourdon

⁸ Statement of Ernest M. Skinner, organ builder.

8' First Diapason
8' Second Diapason
8' Third Diapason
8' Gross Floete
8' Philomela
8' Gedackt
8' Erzähler
8' Dulciana
4' Flute
4' Octave
Solo Mixture
8' Cornopean
8' Tuba

Swell Organ

16' Bourdon
8' Diapason
8' Salicional
8' Aeoline
8' Unda Maris
8' Gedackt
8' Spitz Floete
8' Quintadena
Voix Celestes
4' Octave
4' Flute
2' Flautino
Solo Mixture
16' Horn
8' Cornopean
8' Oboe
4' Clarion
Tremolo

Choir Organ

16' Gamba
 8' Geigen Principal
 8' Concert Flute
 4' Flauto Traverso
 2' Piccolo
 8' Clarinet
 8' Orchestral Oboe
 Celesta
 Tremolo

Solo Organ

16' Orphicleide
 8' Orchestral Oboe
 8' Clarinet
 8' Tuba
 4' Clarinet
 Philomela

Pedal Organ

32' Bourdon
 16' First Bourdon
 16' Second Bourdon
 16' Diapason
 16' Gamba
 8' Gedackt
 8' Octave
 8' Cello
 4' Clarion
 4' Super Octave
 10 2/3' Quinte
 16' Horn
 16' Ophicleide
 8' Tuba

Echo Organ

8' Rühr Floete
 8' Cor Anglais
 8' Harmonica Aetheria
 8' Vox Humana
 4' Flute

Couplers

Echo to Swell
Swell to Great
Swell to Swell 4'
Swell to Swell 16'
Swell to Great 4'
Swell to Great 16'
Swell to Choir
Swell to Pedal
Great to Pedal
Great to Great 4'
Choir to Great
Choir to Choir 16'
Choir to Choir 4'
Choir to Pedal

Pedals

Great to Pedal Reversible
Sforzando
Swell
Choir
Crescendo

CHAPTER V

THE ORGANS AT CHRIST CHURCH 1736 TO 1944

Probably the oldest organ being used in a Boston church to-day is at Christ Church, "The Old North Church of Paul Revere Fame." It was preceded by two organs, one of which was the second organ installed in a Boston church, following the first King's Chapel organ by twenty-two years.

In 1736 an organ was bought from William Claggett of Newport, Rhode Island. It is said that Mr. Claggett came to Boston to set up the instrument, but it has not been discovered whether it had been imported or made by Mr. Claggett in this country. Thomas Johnston repaired it in 1750 and moved some of the bass pipes around. The specifications of the organ have not been found, so it is undetermined whether these bass pipes were played from a pedal board or from the manual. As the first pedal board used in England was not used until 1790, it is doubtful if this early instrument possessed one.

In 1752, Thomas Johnston rebuilt the organ and was required by the church to retain as much of the old instrument as possible. Then by agreement with the church he built his own organ, which was to have "an echo equal to that of

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Trinity."¹ His work was completed in 1759.

William Goodrich rebuilt the interior of the organ, widening the Johnston case by two pipes on each side. Whether this organ included any pipes from the Johnston organ still remains undecided. Mr. Goodrich completed his work and was paid \$1,200 on April 23, 1821. The organist at that time, James Hooten, received \$25 per quarter and the blower received \$2.50 per quarter. There are no records that the Goodrich organ was ever rebuilt.²

On December 8, 1884, Hutchings and Plaisted was paid \$1,200 to furnish the old organ with new actions.

These actions had been constructed by them ten years earlier for an organ at Lawrence. Was the pedal board built by them? It is practically up to the standard for two octaves, is comfortable in performance, though the keys are not quite as broad as at present. . . . The mechanism should be modernized. The soft register has beauty, the full organ not great volume but characterful brilliance. The pedal organ is weak because there is no coupler between the pedal and swell so that the lower swell is not available. There is a very creditable double diapason.³

A letter from Christine M. Ayars to Mr. W. M. Keith

¹ Cornelia Bartow Williams, Ancestry of Lawrence Williams, Part II Ancestry of His Mother Cornelia Johnston, Descendant of Thomas Johnston of Boston, p. 177, cited by Christine M. Ayars, op. cit., p. 141.

² Harrison Lovewell, Boston's Oldest Organ, The Diapason, September 1, 1925, p. 35.

³ Ibid.

dated July 13, 1936 states that the 1821 organ was repaired in 1834, and gives this further information, which obviously does not agree with Mr. Lovewell.

Mr. William Goodwin, an organ builder in Lowell, Mass., who has kept out of interest, careful records about organ building, has made a note that this was a poor rebuild by Stevens. He knew Mr. Stevens personally. Since Mr. Stevens started in business as Stevens and Gayetty and acquired the business of William Goodrich after his death, which occurred in 1833, this may be the firm which did the work.

Quoting Miss Ayars further from page 142 of her book, "In 1884 Hutchings, Plaisted & Co. rebuilt this [1834] and placed the Stevens organ from Trinity, Lawrence, behind the case."

This again disagrees with Mr. Lovewell, who believes only the trackers were installed at this time.

In 1912 the organ was repaired, but the tracker action still remains to-day, and the pedal board has only twenty-five notes. The sharp keys are very narrow and the whole pedal board slants, in a way to make playing very difficult, notwithstanding Mr. Lovewell's statement to the contrary. The manual compass has only fifty-six notes. The ratchet swell remains in the extreme right of the front panel. The stops are arranged in haphazard fashion; for example the Stopped Diapason, upper register is separated from the Stopped Diapason, lower register. The stop list

as it remains to-day is:

Stops at the player's left

1st terrace

8' Open Diapason
16' Principal Bass
16' Bourdon Bass

2nd terrace

8' Stopped Diapason, Swell
4' Principal
8' Viol de Gamba
8' Bourdon, Swell
Couple Great and Swell

3rd terrace

8' Hautboy
8' Cornet
8' Stopped Diapason, Bass
Tremolo
Couple Pedals and Great

Stops at the player's right

1st terrace

Bellows Signal
8' Trumpet
8' Flute
Sesquialtra

2nd terrace

2 2/3' Fifteenth
2' Twelfth
8' Stopped Diapason, bass
8' Melodia, treble
8' Keraulophon

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3rd terrace

	Pedal Check
16'	Double Open Diapason, Bass
4'	Principal
8'	Dulciana
8'	Open Diapason

CHAPTER VI

THE ORGANS AT TRINITY CHURCH 1744 TO 1944

Trinity Church claims the third organ installed in a Boston church. The earliest building was on Summer Street where service was held for the first time on August 15, 1735. The interior of the church was not completed at that time. In 1741 Peter Faneuil offered 100 pounds toward buying an organ but it was not until 1744 that an organ was imported from England and installed at a cost of 382 pounds. No records have been found describing this organ but William Goodrich repaired it in 1752. The following letter reprinted from the Evening Transcript by Dwight's Journal of Music, October 13th, 1860, page 232, gave the only information found about the instrument. Mr. P. A. von Hagen was organist at Trinity from 1801 to 1809, so he must have referred to this first instrument.

P. A. von Hagen, Organist of the Trinity Church, Boston Respectfully informs the honorable Wardens of said Church that their Organ is much out of Repair and Tune. By a close Examination of it he found; That the greater part of the metal pipes are onsodered and stoped with a Stuff, which generally gathers on lead; the wooden ones onglued; the Trumpet Supporters are partly dislodged, and the principal part of the Reeds are eaten up by Verde-grease. The wooden pipes, as well as the metal ones must be voiced. The keys want to be regulated. The Cloth underneath of the Keys is eat by the moths. Ten pipes are missing. The great part of the Leather of the Bellows is cracked and must be new. The Conductors leak; the tops and bottoms of the leaders

and Rollers are worn so much that they cause a Rattling while playing; they also make the Keys stick fast. The touch has sunk an eighth of an Inch. The Levell-box is warpt. In short, there is no Article in the whole instrument, but what wants more or less Repair. It is however a Common Case with an Organ which is getting old. The Reparation of it will cost by a moderate Calculation, about one hundred Dollars. The Organ might be greatly improved by an Addition of Pedals for to play the low Bass with the Feet, as it has an excellent Effect in slow Psalm Tunes. The cost of which would not exceed Thirty Dollars.

He respectfully sollicitis that his Salary, which is now \$150, may be raised to \$200 per Annum.

The Motives of This Request are as follows:

- 1st. Having a Prospect of a larger Salary somewhere else.
- 2nd. House Rent and Provisions being unusually high, and
- 3rd. Wishing to have the Instrument always in Tune, which ought to be examined every Saturday, and paying for Bellows blowing, he, in his opinion, ought in some regard to be compensated. He has worked and spended his time several Days in Order to make the Organ playable for which he has not made any charge. -- Eve. Transcript.

In spite of the condition of the organ as described in this letter, Trinity was the leading church in expenditure of money for music. As early as 1800 the organist was paid one hundred dollars; the bellows blower, fifteen; and the singing leader, fifty.¹

After a new stone building was consecrated November 11, 1829, Dr. Wainwright, the rector, was sent to England to

¹ H. Earle Johnson, Musical Interludes in Boston, 1795-1830, p. 18.

purchase a new organ. The instrument was first used in March, 1837, when Mr. A. U. Hayter was called from Grace Church, New York, to become organist.² This organ was probably destroyed by the fire of November 10, 1872.

The present building in Copley Square was begun at that time, and the consecration service was held February 9, 1877. It was interesting to note that in a detailed description of the church by Mr. H. H. Richardson, the architect, it simply mentioned that the organ was being fixed in position and tuned.

The specification and description of the organ were printed in the Traveller and copied by Dwight's Journal of Music of February 3, 1877. The organ was manufactured by Mr. Hilborne L. Roosevelt of New York. Its three manuals were of 58 note compass, CC to a; the pedal compass CCC to F, 30 notes.

Specification -- Roosevelt organ
From the Traveller
Organ at Trinity Church, Boston

Great Organ

16'	Open Diapason, metal	58 pipes
8'	Open Diapason, metal	58 pipes
8'	Open Diapason, English metal	58 pipes
8'	Violon Open, metal	58 pipes

² John S. Dwight and Charles C. Perkins, History of the Handel and Haydn Society, Vol. I, p. 117. John S. Dwight, editor, Dwight's Journal of Music, Vol. XXXIII, p. 71.

8'	Doppel Flute, wood	58 pipes
8'	Melodia, wood	58 pipes
4'	Wald Flute, wood and metal	58 pipes
4'	Principal, metal	58 pipes
2 2/3'	Twelfth, metal	58 pipes
2'	Fifteenth, metal	58 pipes
2'	Mixture, 4 Rks., metal	32 pipes
16'	Trumpet, metal	58 pipes
8'	Trumpet, metal	58 pipes
4'	Clarion, metal	58 pipes

Swell Organ

16'	Bourdon, wood	58 pipes
8'	Open Diapason, metal	58 pipes
8'	Salicional, metal	58 pipes
8'	Dolce, metal	58 pipes
8'	Stop Diapason, wood and metal	58 pipes
4'	Flute Harmonic, wood and metal	58 pipes
4'	Principal, metal	58 pipes
2'	Cornet, metal	90 pipes
16'	Contra Fagotto, metal	58 pipes
8'	Cornopean, metal	58 pipes
8'	Oboe, metal	58 pipes
8'	Vox Humana, metal	58 pipes

Choir Organ

8'	Open Diapason, metal	58 pipes
8'	Concert Flute, wood	58 pipes
8'	Gamba, metal	58 pipes
8'	Dulciana, metal	58 pipes
8'	Stop Diapason, wood and metal	58 pipes
4'	Violana, wood and metal	58 pipes
4'	Rohr Flute, wood	58 pipes
2'	Piccolo, metal	58 pipes
8'	Clarionette, metal	58 pipes

Pedal Organ

32'	Contra Bourdon, wood	30 pipes
16'	Open Diapason, wood	30 pipes
16'	Dulciana, metal	30 pipes
16'	Bourdon, wood	30 pipes

1882	Jan 1	Balance	100.00
	Feb 1	Interest	1.00
	Mar 1	Interest	1.00
	Apr 1	Interest	1.00
	May 1	Interest	1.00
	Jun 1	Interest	1.00
	Jul 1	Interest	1.00
	Aug 1	Interest	1.00
	Sep 1	Interest	1.00
	Oct 1	Interest	1.00
	Nov 1	Interest	1.00
	Dec 1	Interest	1.00
	Total		12.00

1883	Jan 1	Balance	100.00
	Feb 1	Interest	1.00
	Mar 1	Interest	1.00
	Apr 1	Interest	1.00
	May 1	Interest	1.00
	Jun 1	Interest	1.00
	Jul 1	Interest	1.00
	Aug 1	Interest	1.00
	Sep 1	Interest	1.00
	Oct 1	Interest	1.00
	Nov 1	Interest	1.00
	Dec 1	Interest	1.00
	Total		12.00

1884	Jan 1	Balance	100.00
	Feb 1	Interest	1.00
	Mar 1	Interest	1.00
	Apr 1	Interest	1.00
	May 1	Interest	1.00
	Jun 1	Interest	1.00
	Jul 1	Interest	1.00
	Aug 1	Interest	1.00
	Sep 1	Interest	1.00
	Oct 1	Interest	1.00
	Nov 1	Interest	1.00
	Dec 1	Interest	1.00
	Total		12.00

1885	Jan 1	Balance	100.00
	Feb 1	Interest	1.00
	Mar 1	Interest	1.00
	Apr 1	Interest	1.00
	May 1	Interest	1.00
	Jun 1	Interest	1.00
	Jul 1	Interest	1.00
	Aug 1	Interest	1.00
	Sep 1	Interest	1.00
	Oct 1	Interest	1.00
	Nov 1	Interest	1.00
	Dec 1	Interest	1.00
	Total		12.00

8'	Violoncello, metal	30 pipes
8'	Flute, wood	30 pipes
4'	Principal, metal	30 pipes
16'	Trombone, wood	30 pipes

Couplers

Swell to Great
Swell to Pedal
Swell to Choir
Great to Pedal
Choir to Pedal

Tremulant Swell
Bellows Signal

Combination Pedals

Great Forte or Full Organ	Swell Forte
Great Mezzo	Swell Mezzo
Great Piano	Swell Piano

Reversible Pedal for Great to Pedal
Balance Swell Pedal

The Pneumatic Lever is applied to the Great Organ
The Pneumatic Lever is applied to the Swell Organ
The Pneumatic Lever is applied to the Choir Organ
The Pneumatic Lever is applied to the Pedal Organ
The Pneumatic Lever is applied to the Draw Stop Action

The instrument stood in an organ chamber on one side of the chancel, the space that is now occupied by the baptistery and the gallery above. One set of front pipes was in the chancel and another in the transept, and both were decorated by Mr. John La Farge, who designed and supervised the decorations of the church. The keys were on the level of the gallery in the transept. The bellows, levers and hydraulic engines were in the basement, and the rest of the organ built

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up in four stories over it. An echo organ was placed over the ceiling and connected electrically with the organ. Its imitation of a choir singing in the distance was said to have been quite remarkable. The measurements for the Vox Humana stop were taken from the famous one in Freiburg, Switzerland.

The key action was tracker, but the wind chests were constructed in a new way using compressed air to a certain extent in place of mechanical action. A separate valve was provided for each pipe which assisted in the voicing and tuning of the instrument. Owing to this "peculiar" construction of the wind chests, they were not liable to stick or cypher. The reeds and mixtures of the great organ were placed in the swell box. The combinations on the combination pedals were controlled by the organist and could be changed at any time. From one stop to full organ could be set on any pedal. The pedal wind chests were the invention of Mr. Thomas Winans of Baltimore. The Roosevelt organ was moved to the west gallery in 1880 when a chorus choir was inaugurated.

In 1900 new wind chests and tubular pneumatic action were installed. The pitch of the organ was lowered and the keyboard was detached and located centrally in the choir gallery. The organ was enlarged by Mr. James Cole of Boston. The Great organ then contained 14 stops; Swell, 15 stops; Choir, 9 stops; and Pedal, 8 stops. There were 8 couplers and

The first thing I noticed when I stepped out of the car was the cold. It was a sharp contrast to the warm blanket I had been sitting under. I looked up at the sky, which was a pale, hazy blue. The air was still, and the only sound I could hear was the distant hum of traffic. I took a deep breath, feeling the cool air fill my lungs. I was alone in the world, and for a moment, I felt a sense of peace. I walked towards the building, my footsteps echoing on the wet pavement. The building was old, with a weathered facade and a small sign that read "The Old House". I pushed open the heavy door, and a warm, musty smell greeted me. I looked around, taking in the details of the room. There were bookshelves filled with old books, a large wooden table, and a fireplace. I walked towards the fireplace, where a small fire was burning. I sat down on a chair, feeling a sense of comfort. I looked at the fire, and for a moment, I forgot about the world outside. I was home.

13 pedal movements. There was a 30 note pedal board.

A newspaper clipping found in the Truette Collection, Vol. 8, page 38, described the work to be done.

The organ will have a grand crescendo attachment. The wind will be supplied from large bellows which are placed in the south west tower with four feeders, worked by a five horse power electric motor, and distributed through four reservoirs of different wind pressures which will be placed within the organ. These are all self governing after the power has been turned on. About the middle of October, it is expected the new organ will be ready for use. When arrangements have been perfected for the transforming of the altar, the new organ will be removed to its permanent position.

The tubular pneumatic action was changed to electro-pneumatic action in 1902. At this time, the console was moved to the chancel and the Hutchings-Votey Organ Co. of Boston was engaged to install a three manual organ in the chancel, the gift of Mr. and Mrs. William V. Kellen. The Gamba (great) and Voix Celestes of the nave organ were also a portion of this gift. Both chancel and nave organs were made playable from the same console which was placed on the right side of the chancel, parallel with the choir stalls, which were added at this time. The chancel organ was installed so that some of the pipes extended out into the chancel at the left, and there was also an opening for pipes in the east side of the north transept. Specifications³

³ Everett Truette Collection, Vol. IX, Nave specifications. Original contract, chancel specifications.

at that time were:

Compass of Manuals: Chancel Division -- C to C⁴
 Nave Division -- C to a³

Compass of Pedals (in each Division) -- C to f¹

Great Organ

Chancel Division

16'	Open Diapason	Wood and metal	61 pipes
8'	First Open Diapason	metal	61 pipes
8'	Second Open Diapason	metal	61 pipes
8'	Gross Floete	wood	61 pipes
8'	Gross Gamba	metal	61 pipes
4'	Flute Harmonique	metal	61 pipes
4'	Octave	metal	61 pipes
2 2/3'	Twelfth	metal	61 pipes
2'	Fifteenth	metal	61 pipes
8'	Trumpet	metal	61 pipes

Nave Division

16'	Diapason	
8'	First Diapason	
8'	Second Diapason	
8'	Gamba (Solo)	
8'	Double Flute	
8'	Melodia	
4'	Flute	
4'	Octave	
2 2/3'	Twelfth	
2'	Fifteenth	
V Rks.	Mixture)	Enclosed
16'	Trumpet)	in
8'	Trumpet)	swell
4'	Clarion)	box

Swell Organ

Chancel Division

16'	Lieblich Gedackt	wood	61 pipes
8'	Diapason	metal	61 pipes
8'	Salicional (old type)	metal	61 pipes
8'	Stopped Diapason	wood	61 pipes

1. The first part of the document is a list of the names of the persons who have been appointed to the various offices of the County of ...
 2. The second part of the document is a list of the names of the persons who have been appointed to the various offices of the County of ...
 3. The third part of the document is a list of the names of the persons who have been appointed to the various offices of the County of ...

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	4'	Violina	metal	61 pipes
	4'	Flute à Cheminee	wood and metal	61 pipes
	2'	Flautino	metal	61 pipes
II Rks.		Dolce Cornet	metal	122 pipes
	8'	Cornocean	metal	61 pipes
	8'	Oboe	metal	61 pipes
		Tremolo		

Nave Division

	16'	Bourdon		
	8'	Diapason		
	8'	Bourdon		
	8'	Salicional		
	8'	Dolce		
	8'	Voix Celestes (II Rks.)		
	8'	Gamba (from Voix Celestes)		
	4'	Violin		
	4'	Flute		
IV Rks.		Dolce Cornet		
	16'	Fagott		
	8'	Cornocean		
	8'	Oboe		

Choir Organ

Chancel Division

(Inclosed in a Swell box)

	8'	Geigen Principal	metal	61 pipes
	8'	Concert Flute	wood	61 pipes
	8'	Gedackt	wood	61 pipes
	8'	Dulciana	metal	61 pipes
	4'	Wald Flute	wood	61 pipes
	4'	Fugara	metal	61 pipes
	8'	Clarinet	metal	61 pipes
		Tremolo		

Nave Division

	16'	Dulciana		
	8'	Diapason		
	8'	Salicional		
	8'	Melodia		
	8'	Dulciana		
	4'	Flute		

4' Violin
 2' Piccolo
 8' Clarinet
 Tremulant

Pedal Organ

Chancel Division (Augmented)

16'	Open Diapason	wood	30 pipes
16'	Violone	wood	30 pipes
16'	Bourdon	wood	30 pipes
16'	Gedackt (from Swell)	wood	30 pipes
8'	Octave	wood	30 pipes
8'	Violoncello	wood and metal	30 pipes
8'	Flute	wood	30 pipes
8'	Gedackt (from Choir)	wood	30 pipes
10 2/3'	Quinte	wood	30 pipes

Nave Division

32'	Bourdon	
16'	First Diapason	wood
16'	Second Diapason	metal
16'	Bourdon	
16'	Dulciana	
8'	Violoncello	
8'	Flute	
16'	Trombone	

Couplers

Chancel Division

Swell to Great
 Swell to Swell 4'
 Swell to Swell 16'
 Swell to Great 4'
 Swell to Great 16'
 Swell to Choir
 Swell to Pedal
 Great to Pedal
 Choir to Great
 Choir to Great 16'
 Choir to Pedal

Nave Division

Swell to Great
 Choir to Great
 Swell to Choir
 Great to Choir
 Swell to Great Octaves
 Swell to Great Sub Octaves
 Swell to Swell Octaves
 Swell to Swell Sub Octaves
 Great to Pedal
 Swell to Pedal
 Choir to Pedal

Combinations

Chancel Division

1
 2 } Operating on
 3 } Great and Pedal
 0 }

1
 2 } Operating on
 3 } Swell and Pedal
 4 }
 0 }

1
 2 } Operating on
 0 } Choir and Pedal

General Release
 Pedal Release

Nave Division

Pedals Locking Down

1 } For Swell
 2 } and
 3 } Pedale

1 } For Great
 2 } and
 3 } Pedale

- 1) For Choir
- 2) and Pedale

Pedal Movements

Chancel Division

Great to Pedal Reversibles
 Sforzando (Full Organ)
 Balanced Swell
 Balanced Choir
 Balanced Crescendo

Nave Division

Great to Pedal Reversibles
 Full Organ
 Balanced Swell
 Balanced Crescendo
 Swell Tremulant

Also the following separation movements (piston)

Chancel Division

Great to Keyboard
 Swell to Keyboard
 Choir to Keyboard
 Pedal to Keyboard

Nave Division

Great to Keyboard
 Swell to Keyboard
 Choir to Keyboard
 Pedale to Keyboard

Nave Organ (entire) to Keyboard	} pedals mutually releasing
Chancel Organ (entire) to Keyboard	

Nave and Chancel Organs (entire) to Keyboard (locking pedal)

Wind and Crescendo Indicators for each organ

Page 1

Received of

the sum of

Five hundred and no/100

for the purchase of

the sum of

Five hundred and no/100

the sum of

Five hundred and no/100

Five hundred and no/100

Five hundred and no/100

Electro-pneumatic action.
Detached key desk.
Concave and radiating pedal board.
Case design subject to the approval of the Vestry.
Details of Console subject to the approval of
Mr. J. Wallace Goodrich.

In addition to the above the party of the first part agrees to furnish and install in the Swell of the present gallery organ on 8 ft. Vox Celestis, 61 pipes, and an 8 ft. Viol d'Orchestre, 61 pipes, to take the place of the present Octave and Vox Humana; the register knob of the Vox Celestis to draw with it the Viol d'Orchestre.

In 1924 the chancel organ was rebuilt and revoiced by James Cole. Meanwhile the gallery organ was becoming more and more antiquated and was a handicap to the artistic performance of the music. The wind supply was kept steady in the reservoir by a battery of feeders. These feeders were controlled by a shaft, run with a five foot wooden pulley. At a service in December, 1925, during the preaching of the sermon this pulley fell off and rolled around the organ loft with a great rumbling sound. This made it quite apparent to all present that a new organ was needed and when the appeal was made, the response was almost instantaneous. Dr. Sherrill announced on Christmas Day, 1925, "the gift of a magnificent new organ to replace the old one in the west gallery," the gift of Mrs. T. Jefferson Coolidge.

The dedication service for the new organ built by Ernest M. Skinner Co. was held October 31, 1926. The new organ contained three complete sets of chorus reeds, many

beautiful solo reeds, chimes, harp and celesta stops. A new console was built on the left side of the chancel and is the one in use to-day. The old gallery organ, with the exception of the 32 ft. Bourdon, on which pipes the LaFarge decoration may still be seen, was sold to the Lawes Organ Co. of Beverly and is now in a Catholic Church in New Bedford.

Louis Vierne, one of the greatest French organists, and famous throughout the world for his compositions, spoke of the organ at Trinity in his Memoirs. In 1927, he was in America trying to interest his friends here in the rebuilding of the Notre Dame organ in Paris. He said, "Ernest M. Skinner, the organ builder, offered to construct a modern console of the same type as the one at Trinity Church in Boston. That was beyond my most cherished dream."⁴

When the chancel was redecorated in 1938, the chancel organ pipes were concealed behind two carved and moulded wood organ chamber grilles finished in gold leaf. With the recent additions to both chancel and nave organs the specifications are as follows:

Trinity Church

Ernest M. Skinner Company

Compass of manuals	C -- C ⁴
Compass of pedals	C -- g ³

⁴ Louis Vierne, Memoirs, translated by Esther Jones, The Diapason, 30th year, No. 9, p. 9; August 1, 1939.

Chancel Organ

Great

16'	Diapason
8'	First Diapason
8'	Second Diapason
8'	Flute
8'	Viola
4'	Octave
4'	Harmonic Flute
2 2/3'	Twelfth
2'	Fifteenth
	Mixture
8'	Trumpet

Swell

16'	Bourdon
8'	Diapason
8'	Gedeckt
8'	Salicional
4'	Chimney Flute
4'	Violina
2'	Flautino
3 Rks.	Dolce Cornet
8'	Cornopean
8'	Oboe
	Tremolo

Choir

8'	String Diapason
8'	Gedeckt
8'	Flute
8'	Dulciana
4'	Flute d'Amour
2 2/3'	Nazard
8'	Orchestral Oboe

Pedal

16'	Diapason
16'	Bourdon
16'	Echo Bourdon (Swell)
16'	Violone
8'	Bourdon

THE HISTORY OF THE

REIGN OF

CHARLES THE FIRST

BY

JOHN BURNET

OF

THE

UNIVERSITY OF

OXFORD

IN TWO VOLUMES

THE SECOND

VOLUME

BY

JOHN BURNET

OF

THE

UNIVERSITY OF

OXFORD

Printed by J. Stansfeld, Printer to the University of Oxford, at the University Press, in the City of Oxford.

8' Octave
 8' Cello
 8' Gedeckt (Choir)

Nave Organ

Great

16' Bourdon (Pedal)
 8' First Diapason
 8' Diapason
 8' Doppel Flute
 8' Erzähler
 1 Rk. Gamba Celeste
 4' Octave
 4' Flute
 2 2/3' Twelfth
 2' Fifteenth
 16' Ophecleide
 8' Tromba
 4' Clarion
 Mixture
 Chimes

Swell

16' Bourdon
 8' Diapason
 8' Stopped Diapason
 8' Spitz Flute
 8' Quintadena
 8' Salicional
 8' Dulcet
 8' Voix Celeste
 8' Flute Celeste
 4' Octave
 4' Violina (new 1944)
 2' Piccolo
 3 Rks. Mixture
 5 Rks. Harmonics (new 1944)
 16' French Trumpet (new 1944)
 8' Trumpet
 4' Clarion
 8' Oboe
 8' Vox Humana
 Tremolo

1. 1900		100
2. 1901		100
3. 1902		100
4. 1903		100
5. 1904		100
6. 1905		100
7. 1906		100
8. 1907		100
9. 1908		100
10. 1909		100
11. 1910		100
12. 1911		100
13. 1912		100
14. 1913		100
15. 1914		100
16. 1915		100
17. 1916		100
18. 1917		100
19. 1918		100
20. 1919		100
21. 1920		100
22. 1921		100
23. 1922		100
24. 1923		100
25. 1924		100
26. 1925		100
27. 1926		100
28. 1927		100
29. 1928		100
30. 1929		100
31. 1930		100
32. 1931		100
33. 1932		100
34. 1933		100
35. 1934		100
36. 1935		100
37. 1936		100
38. 1937		100
39. 1938		100
40. 1939		100
41. 1940		100
42. 1941		100
43. 1942		100
44. 1943		100
45. 1944		100
46. 1945		100
47. 1946		100
48. 1947		100
49. 1948		100
50. 1949		100
51. 1950		100
52. 1951		100
53. 1952		100
54. 1953		100
55. 1954		100
56. 1955		100
57. 1956		100
58. 1957		100
59. 1958		100
60. 1959		100
61. 1960		100
62. 1961		100
63. 1962		100
64. 1963		100
65. 1964		100
66. 1965		100
67. 1966		100
68. 1967		100
69. 1968		100
70. 1969		100
71. 1970		100
72. 1971		100
73. 1972		100
74. 1973		100
75. 1974		100
76. 1975		100
77. 1976		100
78. 1977		100
79. 1978		100
80. 1979		100
81. 1980		100
82. 1981		100
83. 1982		100
84. 1983		100
85. 1984		100
86. 1985		100
87. 1986		100
88. 1987		100
89. 1988		100
90. 1989		100
91. 1990		100
92. 1991		100
93. 1992		100
94. 1993		100
95. 1994		100
96. 1995		100
97. 1996		100
98. 1997		100
99. 1998		100
100. 1999		100

Choir

16'	Dulciana
8'	Diapason
8'	Melodia
8'	Dulciana
8'	Kleine Erzähler
8'	Flügel Horn
4'	Flute d'Amour
2 2/3'	Nazard
2'	Piccolo
1 3/5'	Tierce
	Mixture
8'	Orchestral Oboe
8'	Clarinet
	Celesta
	Harp

Solo

8'	Gamba
8'	Gross Flute
8'	English Horn
8'	French Horn
1 Rk.	Gamba Celeste
4'	Flute
8'	Tuba Mirabilis
	Chimes
	Tremolo

Pedal

32'	Bourdon
16'	First Diapason
16'	Second Diapason
16'	Echo Bourdon (Swell)
16'	Violone
16'	Bourdon
16'	Dulciana (Swell)
8'	Flute
8'	Still Gedeckt (Swell)
8'	Cello
32'	Bombarde
16'	Trombone
16'	French Trumpet (Swell)
8'	Tromba

Accessories

Adjustable Hand-Pistons

Nave

Six to Great
 Seven to Swell
 Six to Choir
 Four to Solo
 Three to Couplers
 Three to Entire

Chancel

Four to Great
 Five to Swell
 Four to Choir
 Two to Couplers
 Three to Entire

Adjustable Foot-Pistons

Nave

Three to Great
 Two to Swell
 Four to Pedal

Chancel

Three to Great
 Two to Swell

Reversible Hand-Pistons

Pedal to Combinations (both organs)
 Sforzando (both organs)
 Nave Organ alone (on each manual and pedal)
 Chancel Organ alone (on each manual and pedal)
 Both Organs (on each manual and pedal)
 Choir and Solo Shoe (Nave)

Tablet Couplers

Chancel

Great to Pedal
 Swell to Pedal
 Choir to Pedal
 Swell Octave to Pedal
 Swell to Great Sub
 Swell to Great
 Swell to Great Octave
 Choir to Great Sub
 Choir to Great
 Choir to Great Octave
 Swell Sub
 Swell Octave
 Swell to Choir

Choir Sub
 Choir Octave
 Great Octave
 Chancel Organ alone
 Both Organs on

Nave

Great to Pedal
 Swell to Pedal
 Choir to Pedal
 Solo to Pedal
 Swell to Pedal Octave
 Swell to Great Sub
 Swell to Great
 Swell to Great Octave
 Choir to Great
 Swell Sub
 Swell Octave
 Swell to Choir
 Solo to Great Sub
 Solo to Great
 Solo to Great Octave
 Solo to Choir
 Choir Octave
 Great to Solo
 Solo Sub
 Solo Octave
 Nave only

Foot-Pistons

Chancel

Great to Pedal reversible
 Sforzando reversible

Nave

Great to Pedal reversible
 Pedal Chimes
 Sforzando reversible

Combination Foot-Pistons

Chancel Organ alone
 Both Organs
 Nave Organ alone

Release Pistons

All manual 16 ft. stops
All swells
Chancel General Release
Nave General Release

Balanced Swell Pedals

Chancel Swell
Chancel Choir
Chancel Crescendo
Nave Swell
Nave Choir or Solo
Nave Crescendo

Indicators

Chancel Crescendo
Chancel Sforzando
Nave Crescendo
Nave Sforzando

CHAPTER VII

FIRST NEW ENGLAND ORGAN BUILDERS

It has been seen that the first three organs in Boston churches were probably all imported. With these instruments to repair and study, interest was soon shown in the construction of organs in New England.

The first organ to be made in America was probably built by Dr. Christopher Witt, who emigrated in 1704 from England. He was one of the Wissahickon group who later settled in Germantown, Pennsylvania, and while with the Menonite colony possessed an organ of his own construction. It is said he built the organ which was installed in Christ Church, Philadelphia in 1728.¹ Although the work in Boston started later, the city soon developed into the leading center of the industry.

Unless it be proved that William Claggett built the Christ Church organ, he installed in 1736, the first Boston organ was made by Edward Bromfield, Jr. Mr. Bromfield was born in Boston in 1723 and was graduated from Harvard College in 1742. In 1745 he started his organ, but died in 1746 before he was able to complete it. During the seige of Boston, this organ was moved from the Old South Church to a store owned by

¹ Henry W. Foote, Three Centuries of American Hymnody, p. 130.

William Phillips, where a fire destroyed it. The Reverend Thomas Prince, minister of the Old South Church, described the organ:

As he was well skilled in Music, he for exercise and recreation, with his own hands, has made a most accurate Organ, with two rows of keys and many hundred pipes, his intention being twelve hundred, but he died before he completed it. The workmanship of the keys and pipes surprisingly nice and curious, exceeding anything of the kind that ever came here from England. And what was surprising was that he had but a few times looked into the inside work of two or three organs which came from England.²

Soon after Mr. Bromfield died, the name of Thomas Johnston appeared as an organ builder. He worked on the Christ Church organ, and in 1754 built an organ for St. Peter's Church in Salem, to replace the one imported from London in 1743. The new organ had one manual and six stops.

On the name board was an inscription in German text, in ivory, as follows -- "Thomas Johnston, fecit, Boston, Nov., Anglorum, 1754." . . . He died in 1768 and was succeeded by Dr. Josiah Leavitt, previously a practicing physician.³

Dr. Josiah Leavitt carried on his business in Boston in 1791 in Quaker Lane. His advertisement in the Columbian Centinel of October 22nd of that year informed the public of his work.

² Henry M. Brooks, Olden-Time Music, p. 32.

³ Christine M. Ayars, Contributions to the Art of Music in America by the Music Industries of Boston 1640 to 1936, p. 143.

Just Finished

And to be sold by the Subscriber

A small agreeable-toned Chamber Organ -- also to be sold, the Organ now standing in Christ's Church in Cambridge. . . .

Inquire at the sign of the Three Coaches, in Quaker Lane -- where he continues to carry on the Organ Building Business. . . .

Josiah Leavitt

The mention of the organ at Cambridge is interesting because the history of the Church records that their first organ installed in 1764 was practically demolished during the Revolution. It was then repaired and served until 1844. It seems strange that Dr. Leavitt should have been selling the organ that was in use at the church.

Dr. Leavitt moved his business from Quaker Lane to Leverett Street, West Boston, leading to Burton's Point, in April, 1792. His advertisements continued in the Centinel through 1793.

Two of his organs were judged important enough for news items in a paper where mention of music was rare. The first concerned a hybrid instrument.

It is with pleasure we announce that our countryman and townsman, Dr. Josiah Leavitt, has lately constructed and completed an Organ under a Harpsicord; -- a piece of mechanism so curious, was never before attempted or executed in America. Either instrument may be played upon separately, or with the greatest ease, be connected together. . . .

Mr. Selby has pronounced as his opinion, that it is superior to any instrument of the kind he ever saw. It

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was built by desire of, and is now owned by Mr. Abiel Smith, of this town.⁴

The other item described the installation for the First Universalist Society.

We never feel more happy than when it is in our power to do justice to the genius and industry of our countrymen. We therefore with pleasure inform the publick of the proficiency made in the art of constructing Organs, by Dr. Leavitt. One of these instruments, made by this gentleman, has lately been purchased by the Universal Religious Society in this town, and erected in their house of worship. For compass and sweetness of sound, and elegance of construction, it is exceeded but by few imported Organs."⁵

However all Boston churches were not using pipe organs at this time as we may judge from the following notice which Mr. Brooks, in Olden-Time Music on page 107 cites from the Columbian Centinel of December 8, 1797. The date is incorrectly quoted as the Centinel was published that year on December 9th and on that date no such notice appeared. An item concerning Dr. Flagg published in 1794 stated that he had just returned to town after an absence abroad. Probably this notice quoted occurred at an earlier date.

READ THIS

Newbury Street, No. 47.

Dr. Flagg, Surgeon-Dentist, intending to embark in the ship Hancock for Liverpool, requests those to whom he is

⁴ Massachusetts Centinel, May 26, 1790, p. 82.

⁵ Ibid., February 8, 1792.

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indebted to apply for payment. . . .

Dr. Flagg, if a sufficient number of purchasers offer, intends to contract in Europe for the construction of a number of Organs, calculated to play all tunes usually sung in places of worship, with interludes to each psalm, without the assistance of an organist. Their prices will be various, supposed from 60 to 300 pounds.

N.B. The construction of the Organs will be adapted to play all the tunes and pieces of music which any particular parish may require, with every direction adapted to the most simple capacity.

P.S. Good security for any advances.

Mr. Henry Pratt of Winchester, New Hampshire, was of next importance after Dr. Josiah Leavitt. He built twenty-three small church organs and nineteen chamber organs.⁶

The turn of the eighteenth century brought the most important pioneer in the organ building business. William Marcellus Goodrich, who had been born at Templeton, Massachusetts, July 21, 1777, with the name William Goodridge, came to Boston in 1799. It was said that his first knowledge of the work was gained from visiting one of Dr. Leavitt's assistants. Upon his return from the visit, he made an organ for himself. Thereafter he was employed by Mr. Pratt at his Winchester shop.

In 1799, and his advent in Boston, he was still gaining knowledge from repairing and tuning organs. He perhaps had

⁶ Providence Journal, June 19, 1848, found in Truette Collection, Vol. 8, p. 20.

access to the organ in Charlestown that Oliver Holden had brought to this country from England. It is now 150 years old and may be seen and played at the Old State House, Boston. It was made by George Astor and Company of 79 Cornhill, London. George Astor was brother of John Jacob Astor. The organ has one manual with the following stops: Principle, Stopped Bass, Open Diapason, and Stopped Treble. The lower octave of the manual started at B, then C, one black key, E, F, F#, G, G#, A, B^b, B and C. It was impossible at the time the writer saw the organ to play it, and determine what notes sounded from this short octave.

By November, 1804, Mr. Goodrich opened his own shop in partnership with his brother Ebenezer. It was located near the junction of Cambridge and Chambers Streets. It was here that he built his first "Church Organ", commissioned for the Catholic Church in Boston, and installed it in 1806. He replaced this with a larger instrument in 1822.

Mr. Goodrich was in business alone or with his brother, or Mr. Appleton, from 1805-1833 and during that time his popularity was so great that only three organs were imported into Boston.⁷ Dr. Channing's Church in Federal Street purchased a Goodrich organ in 1810. This was replaced by another of his organs in 1822. St. Paul's Cathedral and Park Street Church,

⁷ Ibid.

also numbered among his Boston installations, and many of the smaller towns in Massachusetts, as well as New Hampshire and New York purchased Goodrich organs.

Ebenezer Goodrich made about 160 organs. His fame rests largely upon his reed organ, the first built in America.

Eben also made the first musical reed of the reed organ which he then used merely as a stop in parlor organs. Lowell Mason urged him to make an entire reed organ. Mr. Goodrich used the reed stop in his organs 14 years before Mason's son and Hamlin of Mason and Hamlin began to manufacture reed organs.⁸

Before continuing with the New England builders it may not be out of place to note briefly one of the important organs of the three imported at this time.

A large and elegant organ imported from London in the ship London Packet by the Old South Society, is now erecting in their church; it is said to be much superior to any ever imported to this country.⁹

Mr. Henry Bromfield of London had ordered the organ to be built by Thomas Elliott who sent Henry Corrie to this country to set it up. It cost about seven thousand dollars, including freight and duty. It was used for one of the first times November 7, 1822 and Dr. Holmes of Cambridge was the preacher.¹⁰

⁸ Henry A. Goodrich, Church Organs: Some of the Early Builders in New England, pp. 8-9.

⁹ Com. Gazette, October 7, 1822, cited by Hamilton Hill, History of Old South Church, p. 480.

¹⁰ Hamilton Hill, op. cit., p. 480.

Returning to American organ builders, Thomas Appleton, who worked with Goodrich for some years, was also associated with Hoyts, Babcock, and Appleton. Henry Goodrich states in his pamphlet Church Organs that Appleton made thirty-five organs for Boston alone and more than one hundred for other cities. His first complete church organ was used in a church on Summer Street, Boston, then in Providence, and then again in Boston after the great fire in 1872. It was at this time in the new South Church at the corner of Tremont and Camden Streets.

What may be this organ, since it is located in a church at this address now called the People's Baptist Church, is still in use but does not appear rebuilt. It is dated 1844 on the name plate which seems too late for his first complete organ. It has 3 manuals and 34 stops, some divided, and a two octave Pedal Organ. Below Tenor "G" on the Swell there is what amounts to a permanent coupler with the Choir Organ.¹¹

The Barnard Memorial Chapel in Boston used an Appleton organ. "This had 2 manuals, one and a half keyboards, the lower to '40 G' only, Swell to middle 'C' and twelve pedal notes."¹²

John Hays Hammond, Jr., at Gloucester, Massachusetts, had in his possession in 1937 some Pedal wood pipes which

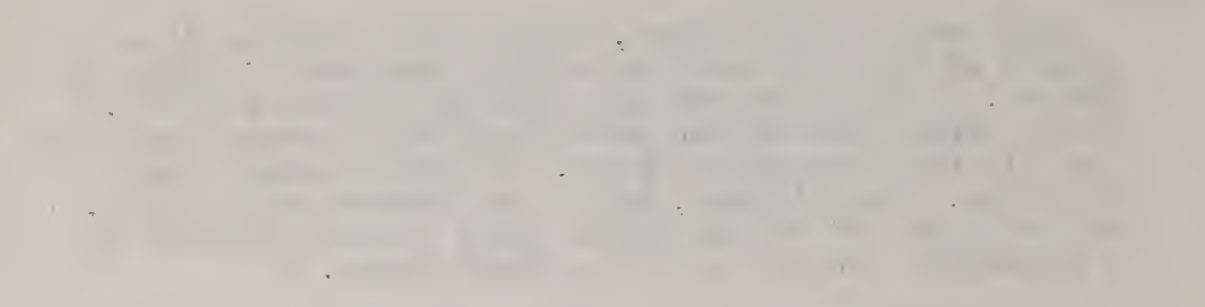
¹¹ Christine M. Ayars, op. cit., p. 153.

¹² Statement of James Cole, organ builder, cited by Christine M. Ayars, op. cit., p. 153.

1. The first part of the paper discusses the importance of understanding the underlying mechanisms of the observed phenomena. This is crucial for developing effective interventions and policies. The authors argue that a comprehensive understanding of the system is necessary to address the complex challenges it presents.

2. The second part of the paper focuses on the methodology used in the study. The authors describe the data collection process, the statistical models employed, and the validation techniques used to ensure the reliability of the results. They emphasize the importance of transparency and reproducibility in scientific research.

3. The third part of the paper presents the results of the study. The authors show that the proposed model accurately predicts the observed outcomes across different scenarios. They also discuss the limitations of the study and the need for further research to refine the model and explore new aspects of the system.



4. The fourth part of the paper discusses the implications of the findings. The authors highlight the potential applications of the model in various fields, such as medicine, engineering, and social sciences. They also discuss the ethical considerations and the need for responsible use of the technology. The authors conclude that the study provides valuable insights into the system and opens up new avenues for research.

5. The fifth part of the paper is a conclusion. The authors summarize the main findings of the study and reiterate the importance of understanding the underlying mechanisms of the system. They also provide a brief overview of the future research directions and the potential impact of the work.

6. The sixth part of the paper is a reference list. The authors cite various sources that have influenced their work, including books, journal articles, and other scientific publications. This section provides a comprehensive overview of the literature related to the study.

7. The seventh part of the paper is an appendix. The authors provide additional information that supports the main text, including supplementary data, detailed derivations, and other relevant information. This section is intended to provide a more complete picture of the study and its findings.

were very large scale and were said to have come from the Appleton organ in the Avenue Methodist Church in Beverly.

One of his most celebrated organs was contracted for the Handel and Haydn Society in 1832 to be used at the Music Hall until the Walcker organ arrived. The first instrument possessed three manuals and a two octave pedal.

The Central Congregational Church, corner of Newbury and Berkeley Streets, in Boston, had one of the largest organs Thomas Appleton ever built. It had 3 manuals and 28 speaking stops and cost \$6,500.

His largest organ was built when Mr. Appleton was eighty-three. It was made for the Baldwin Baptist Church, Canton Street, Boston, and his factory, which was then in Reading, was only large enough to house one third of the instrument at once.

Mr. Appleton died in Reading July 11, 1872, at the age of eighty-seven.

At Fitchburg, in 1847, Jonas P. Whitney owned an organ factory. His instruments had five or more octaves on each keyboard, usually thirteen large wooden pipes for the sub-bass and used a swell pedal. The construction of the bellows was characterized by the use of white sheepskin, as mice were apt to eat leather. The sheepskin was used with a bellows cloth made of firm cotton material dressed on one side with rubber.

This made it necessary to renew it frequently.

Organs were gaining rapidly in public esteem and in numbers all through the nineteenth century. In 1817 there were only nine organs in Boston: King's Chapel, Christ Church, Trinity, First Church, Brattle Square, First Universalist, Catholic, Federal Street, and the New South. By 1852, of the ninety-eight places of public worship in the city, sixty-four contained organs of various sizes. Twenty-one of them had three manuals and from thirty to fifty registers. Boston possessed more organs of variety and power than any other city in the country, in proportion to its population.¹³

¹³ Dwight's Journal of Music, July 10, 1852, citing Messrs. Cutler and Johnson.

CHAPTER VIII

ORGANS DESCRIBED IN DWIGHT'S JOURNAL OF MUSIC

The first volume of Dwight's Journal of Music appeared in 1852. While this publication could not possibly have listed all the organs installed during the years it was printed, the editor was a thorough enough musician to have selected the outstanding instruments for public notice.

The first organ mentioned was built by Mr. John Baker of Boston to be sent to Cleveland, Ohio. Mr. Baker had come from London and by July 24, 1852 had built this, his second organ in the United States. The first was erected for G. J. Webb of Boston. The Cleveland organ was notable because of the extended action, allowing the organist to be in front of the choir.

William's Hall in Washington Street purchased an organ from Messrs. W. B. D. Simmons and Company in Causeway Street in May, 1852. It was built upon the German plan, the compass of keys being from CC to G, and the pedals from CCC to D.

There were 15 registers in all, divided thus:

Registers to Great Organ	15
Registers to Choir Organ	10
Registers to Swell Organ	14
Registers for Couplers	9
Registers to Pedal Organ	4

The news article describing the organ continued:

We notice some new stops in this instrument, viz: in the Choir Organ, the Fagotto (from CC to middle C, 24 pipes), in the Swell, the Double Trumpet; and in the Pedal Organ the Ophicleide and Harmonica (16 feet from CCC to D, 27 pipes).¹

About a year later in the new chapel of the Tremont Temple, a musical was presented to about seventy invited guests. A new organ built by Messrs. E. and G. G. Hook at a cost of \$1,600 was being inaugurated and the Journal recorded that the "lights, from gas burners suspended at intervals all over the ceiling was sufficient, and grateful to the eye and gave a genial aspect to place."²

It was a two manual organ with nine stops in the Great, seven in the Swell, and a twenty note pedal board connected with Double Open Diapason 16 ft. pipes. Mr. Wilcox was the organist and displayed the fine reed stops in the Prayer from Freyschütz. A new name appeared on one stop knob, Viol d'Amour and was described as producing a fine violoncello-like tone.

An Enharmonic Organ, the invention of Messrs. Alley and Poole, evidently of Boston, was used in the church in Indiana Place for some years around 1856.

No temperament, or mathematically perfect time

¹ Dwight's Journal of Music, May 29, 1852, Vol. 1, pp. 62-63.

² Ibid., July 23, 1853, Vol. 3, p. 127.

principle was used. It was an interesting invention, in which each key had its distinctive gamut of pipes, commanded by a pedal. It did not demonstrate itself to the satisfaction of musicians in complicated music, however, where rapid modulations caused one a moment's thought to tell which key to refer to.³

The largest organ in America in 1856 and twenty-third largest in the world was at Tremont Temple and erected by Messrs. E. and G. G. Hook. It possessed 77 stops on four manuals and pedal. S. P. T., obviously S. Parkman Tuckerman, then organist at St. Paul's, gave the following critical analysis of the organ, which seemed of enough interest to quote in full.

The large organ in the Tremont Temple, built by the Hooks, is without doubt the most successful experiment of the kind ever attempted in this country. The mechanical portion of the instrument is not only constructed with marked ability, but in some respects is greatly superior to the best work of the European builders. It has also other good qualities which belong to a first-class organ; yet we cannot say with truth that it compares favorably in many important features with instruments of the same size and general character abroad. All the speaking stops on the four manuals are voiced on too light a wind for an organ designed to fill a hall of such capacity as the Tremont Temple; and, moreover, it is quite apparent that the pipes are not voiced up to the extent of their scales. The diapasons, especially those belonging to the great manual, are of too light volume and too reedy in their

³ Ibid., Vol. 9, p. 118, July 12, 1856.

character for so large an organ, and they are sensibly deficient in that round, bold and lusty character which distinguishes this stop in the best English and German instruments. Another defect in this organ is the want of sufficient wind. There are but three bellows, one supplying the Great, Choir and Swell Organs, one the Pedal organ, and the smallest of the three the Solo Organ. A fourth bellows of the same dimensions and capacity as the two largest (12 feet by 6) is absolutely required to give the proper force and steadiness of tone expected from an organ of such pretension and capacity.

When all the stops and couplers are drawn, and the fullest chords played on either the organ at Tremont Temple or St. Paul's, we shall find more or less unsteadiness of tone perceivable at the very moment the bellows feeders commence and complete their work, besides considerable noise in the blowing action, both of which are serious defects, and ought to have been avoided in organs of such pretensions.

The organ in Tremont Temple has 50 speaking stops, independent of the Solo organ, and only 144 square feet surface of wind, furnished by two bellows 12 feet by 6. Need we say more to prove that we are yet experimenting in some of the details of organ building, which at the present time, if not for centuries, have been understood by the artists of Europe.

S. P. T.⁴

An imposing array of organists played at the opening recital of the Simmons and Willcox organ at the Hollis Street Church in October, 1857. Mr. S. A. Bancroft, probably from the Mount Vernon Church, Mr. J. C. D. Parker, Mr. Baumbach, J. H. Willcox, William R. Babcock, and B. J. Lang all performed. The instrument was described as remarkably effective for its size. There were three manuals of 56 notes and a pedal board from CCC

⁴ Ibid., Vol. 9, p. 86, June 7, 1856.

to D. The total number of stops was 30 and in addition 8 mechanical stops (couplers, tremulant, etc.) The diapasons were rich and lusty; the pedal full and grand; the trumpet spoke with remarkable promptness; the mixtures were sufficiently "criant, without making the pyramid of sound top heavy."⁵

As evidence of the importance of the Boston organ builders, in 1857 there were fourteen Hook organs in the single city of Providence, Rhode Island.⁶ The Unitarian Church in Portsmouth, New Hampshire, purchased one of the best of the E. and G. G. Hook instruments in 1858. In this, "the diapasons were made of pipe metal (for almost the first time in this country) composed to a sufficiently large proportion of pure tin, after the German method."⁷

Beginning around 1856, a discussion was carried on through the columns of the Dwight's Journal of Music concerning the advisability of engaging an American builder for the organ at the Boston Music Hall. The decision was finally in favor of the E. F. Walcker and Company of Ludwigsburg, Germany. This decision was a turning point in Boston organ building, for until the advent of the German organ in 1863, the predominant

⁵ Ibid., Vol. 12, p. 221, October 10, 1857.

⁶ Ibid., Vol. 12, p. 236, October 24, 1857.

⁷ Ibid., Vol. 14, p. 279, November 27, 1858.

The first of these is the fact that the
 of the world is not a uniform one. It is
 a world of many different peoples and
 customs. The second is the fact that the
 world is not a static one. It is a world
 of constant change. The third is the fact
 that the world is not a simple one. It is
 a world of many different problems and
 challenges. The fourth is the fact that the
 world is not a single one. It is a world
 of many different nations and peoples.
 The fifth is the fact that the world is not
 a uniform one. It is a world of many
 different peoples and customs. The sixth
 is the fact that the world is not a static
 one. It is a world of constant change.
 The seventh is the fact that the world is
 not a simple one. It is a world of many
 different problems and challenges. The
 eighth is the fact that the world is not
 a single one. It is a world of many
 different nations and peoples. The ninth
 is the fact that the world is not a
 uniform one. It is a world of many
 different peoples and customs. The tenth
 is the fact that the world is not a static
 one. It is a world of constant change.

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influence here had been English. A great deal has been written about this organ and its subsequent history and as it was not a church organ, it should be considered here only so far as it influenced church organ building. A 30 note pedal keyboard was introduced and as seen by previous specifications, the Americans had been using only 27 notes. The Pedal Organ possessed 20 different registers as against the Americans' 4 or 5. The 32 ft. tone was used in the pedal, and six of the pedal stops enclosed in the Swell box. The proportion of tin in the metal pipes was much higher than had been used by local builders. The Vox Humana, Vox Angelica, and Aeoline were all new to Boston and the proportion of reed tones to the other types of tone was greater, the reed chorus being complete in itself. Mechanically, the crescendo pedal, the balanced swell pedal, intermanual pistons and completed bass register on all Swell stops were all innovations. The wind pressure was greater and the action less noisy. "The case is as great a triumph, perhaps, of the art of decorative architecture, as the interior mechanism is of organ building."⁸

The first large installation in Boston after the Music Hall organ arrived was at the Church of the Immaculate Conception, opened on February 3rd, 1864. It was built by Messrs. E. and G. G. Hook and a very complete description given in the

⁸ Ibid., Vol. 23, pp. 78-79, August 8, 1863.

The first part of the report is devoted to a general description of the project and its objectives. It is followed by a detailed account of the work done during the period covered by the report. The results of the work are then presented, and a conclusion is drawn from the findings. The report is intended to provide a comprehensive overview of the project and its progress, and to serve as a basis for further work.

The project was initiated in 1960, and has since then been carried out in a systematic and planned manner. The main objectives of the project are to investigate the properties of the material, to determine its composition, and to study its behavior under various conditions. The work has been carried out in a number of stages, and the results of each stage are presented in the report.

The first stage of the work was devoted to the determination of the composition of the material. This was done by means of a series of chemical analyses, and the results are given in Table I. The second stage was devoted to the study of the properties of the material, and this was done by means of a series of physical measurements. The results of these measurements are given in Table II.

The third stage of the work was devoted to the study of the behavior of the material under various conditions. This was done by means of a series of experiments, and the results of these experiments are given in Table III. The fourth stage of the work was devoted to the study of the structure of the material, and this was done by means of a series of X-ray diffraction experiments. The results of these experiments are given in Table IV.

The results of the work show that the material has a number of interesting properties, and that its composition and behavior are very different from those of the materials previously studied. The work also shows that the material has a complex structure, and that its properties are determined by this structure. The results of the work are therefore of great interest, and they provide a basis for further work.

The work was carried out in the Department of Chemistry, University of London, and it was supported by the Science Research Council. The author wishes to thank the members of the Department for their help and assistance during the course of the work.

Journal of March 5th, 1864.

This instrument is one of the first fruits of the wholesome impulse given to the art here by the presence of that great masterwork of German art in the Boston Music Hall.

Occupies space of 40 feet in height, 35 feet in width, and more than 20 feet deep. The case built by Messrs. Smith and Crane of New York, from designs by P. C. Keeley, the architect of the church, is in perfect keeping with that noble Roman structure. It has three manuals, from 8 ft. C to A, 58 notes each. The Pedal keyboard has 27 keys from 16 ft. C to D. There are three "double action" composition pedals for the stops of the Great Manual, by which some stops are drawn in while others are pushed out: one pedal of novel contrivance, partly answers the same end for the stops of the Pedal Organ, as the placing of a portion of them in the Swell box in that of the Music Hall, i.e. makes the distinction of forte and piano Pedal; another pedal operates upon the "Pedal and Great" Coupler at pleasure. The "pneumatic lever" is applied to the Great Manual with its couplings and to the Swell Manual, with the same success as in the Music Hall in lightening and equalizing the touch. The action is brought forward and reversed, so that the organist faces the Altar, besides being at such distance from the pipes that he can hear the sounds which leap out at his bidding. The Contents are as follows:

Great Manual

16'	Open Diapason, through in metal	58 pipes
8'	Open Diapason, through in metal	58 pipes
8'	Claribella, through in wood	58 pipes
8'	Stopped Diapason, through in wood (doppel floete)	58 pipes
8'	Viola da Gamba, through in metal	58 pipes
4'	Octave, through in metal	58 pipes
4'	Flute Harmonique, through in metal and wood	58 pipes
2 2/3'	Twelfth, through in metal	58 pipes
2'	Fifteenth, through in metal	58 pipes
2'	Mixture, 3 Rks., large scale	174 pipes
1 1/8'	Mixture, 5 Rks., small scale	290 pipes
16'	Trumpet, from C, in metal	46 pipes
8'	Trumpet, through in metal	58 pipes
4'	Clarion, through in metal	58 pipes
	Blank Slider for additional stop	

Swell Manual

16'	Bourdon Bass)	through in wood	58 pipes
	Bourdon Treble)		
8'	Open Diapason,	through in metal	58 pipes
8'	Violina (new stop),	through in metal	58 pipes
8'	Stopped Diapason,	through in wood	58 pipes
4'	Octave,	through in metal	58 pipes
4'	Flute Harmonique,	through in metal and wood	58 pipes
4'	Octave, Viol d'Amour,	through in metal	58 pipes
2 2/3'	Twelfth,	through in metal	58 pipes
2'	Fifteenth,	through in metal	58 pipes
1 3/4'	Mixture, 5 Rks.,	through in metal	290 pipes
16'	Fagotte, from C,	through in metal	46 pipes
8'	Cornopoean,	through in metal	58 pipes
8'	Oboe,	through in metal	58 pipes
8'	Vox Humana,	through in metal	58 pipes
4'	Clarion,	through in metal	58 pipes
	Blank Slider		

Choir Organ

16'	Bourdon Bass,	wood	12 pipes
16'	Aeolina,	metal	46 pipes
8'	Open Diapason,	through in metal	58 pipes
8'	Dulciana,	through in metal	58 pipes
8'	Keraulophon,	through in metal	58 pipes
8'	Melodia,	through in metal	53 pipes
8'	Stopped Diapason,	through in metal and wood	58 pipes
4'	Octave,	through in metal	58 pipes
4'	Celestina,	through in metal	58 pipes
4'	Flauto Traverso,	through in wood	58 pipes
2'	Piccolo,	through in wood	58 pipes
8'	Clarionet,	through in metal	58 pipes
	Blank Slider		

Pedal Organ

16'	Open Diapason,	wood	27 pipes
16'	Dulciana,	wood	27 pipes
10 2/3'	Quinte,	wood	27 pipes
8'	Violoncello,	metal	27 pipes
16'	Trombone,	wood	27 pipes

Mechanical Registers

Coupler Great and Swell in unison
 Coupler Great and Choir in unison
 Coupler Choir and Swell in unison
 Coupler Pedal and Great
 Coupler Pedal and Swell
 Pedal and Choir
 Pedal at Octaves
 Tremulant for Swell Manual
 Tremulant for Choir Manual
 Ventil for Pedal -- Open Diapason
 Ventil for Pedal -- Quint and Trombone

Room is left for a 32 ft. stop in the Pedal. There is no lack of rich and lively diapason tone; plenty of harmonic or mutation stops; while the mixtures or chorus work give life and sparkle to the flood of tone, without unpleasant screaming. Of single stops, we were struck by the power and lustiness of the Trombone and Trumpet. The Flute Harmonique on the Swell, and the new stop Violina, are exquisite. The Vox Humana startled and delighted the crowd by a closer resemblance to the human voice than in the Music Hall. It is pleasant enough for certain effects, sparingly used; but in no organ can it be valued as much more than a curious fancy; if the tone does suggest the human, it is more like that humming itself through a comb, than like frank outright womanly or manly singing.⁹

This was probably the largest church organ in America.

The Hook organ company in the same year built another large organ, this one for the South Congregational Church where the Reverend Edward Hale was minister and B. J. Lang, organist. This used 30 notes in the pedal keyboard and possessed a 32 ft. pedal stop.

⁹ Ibid., Vol. 23, p. 199, March 5, 1864.

Complete specifications were:

Great Manual

16'	Grand Principal	58 pipes
8'	Montre	58 pipes
8'	Principal	58 pipes
8'	Viola da Gamba	58 pipes
8'	Doppel Flöte	58 pipes
8'	Melodia	46 pipes
4'	Octave	58 pipes
2 2/3'	Twelfth	58 pipes
2'	Fifteenth	58 pipes
2 Rks.	Mixture	116 pipes
2 Rks.	Mixture	116 pipes
8'	Trumpet	58 pipes

Swell Manual

16'	Bourdon Bass and Treble	58 pipes
8'	Open Diapason	58 pipes
8'	Salicional	46 pipes
8'	Gedact Bass and Treble	58 pipes
8'	Dolce Bass and Treble	58 pipes
4'	Flute Harmonique	58 pipes
4'	Octave	58 pipes
4'	Vox Angelica	58 pipes
2'	Piccolo	58 pipes
3 Rks.	Mixture	174 pipes
16'	Trumpet	46 pipes
8'	Trumpet	58 pipes
8'	Oboe	58 pipes
8'	Vox Humana	58 pipes

Choir Manual

16'	Aeolina	58 pipes
8'	Principal	58 pipes
8'	Gedact	58 pipes
8'	Dulciana	58 pipes
4'	Violin	58 pipes
4'	Hohl Pfeife	58 pipes
8'	Clarinet	58 pipes

Chapter 10: The History of the United States

Section 1: Early History

1. The first people to live in North America were Native Americans.	100%
2. The first European settlers in North America were the Pilgrims.	100%
3. The first European to explore North America was Christopher Columbus.	100%
4. The first European to settle in North America was John Rolfe.	100%
5. The first European to explore the Mississippi River was Hernando de Soto.	100%
6. The first European to settle in the Mississippi Valley was the French.	100%
7. The first European to explore the Rocky Mountains was James W. Cook.	100%
8. The first European to settle in the Rocky Mountains was the Spanish.	100%
9. The first European to explore the Pacific Northwest was Captain Cook.	100%
10. The first European to settle in the Pacific Northwest was the British.	100%

Section 2: The American Revolution

1. The American Revolution began in 1775.	100%
2. The American Revolution ended in 1783.	100%
3. The American Revolution was fought between the British and the Americans.	100%
4. The American Revolution was fought in the Eastern United States.	100%
5. The American Revolution was fought in the Western United States.	100%
6. The American Revolution was fought in the Southern United States.	100%
7. The American Revolution was fought in the Northern United States.	100%
8. The American Revolution was fought in the Central United States.	100%
9. The American Revolution was fought in the Pacific Northwest.	100%
10. The American Revolution was fought in the Rocky Mountains.	100%

Section 3: The Civil War

1. The Civil War began in 1861.	100%
2. The Civil War ended in 1865.	100%
3. The Civil War was fought between the Union and the Confederacy.	100%
4. The Civil War was fought in the Eastern United States.	100%
5. The Civil War was fought in the Western United States.	100%
6. The Civil War was fought in the Southern United States.	100%
7. The Civil War was fought in the Northern United States.	100%
8. The Civil War was fought in the Central United States.	100%
9. The Civil War was fought in the Pacific Northwest.	100%
10. The Civil War was fought in the Rocky Mountains.	100%

Pedale

32'	Grand Bourdon	30 pipes
16'	Open Diapason	30 pipes
16'	Dulciana	30 pipes
8'	Violoncello	30 pipes
4'	Flute	30 pipes

Mechanical Registers

Swell to Great Coupler
 Swell to Choir Coupler (Unison)
 Choir to Great Coupler (Unison)
 Great to Pedale Coupler
 Swell to Pedale Coupler
 Choir to Pedale Coupler
 Tremulant (Swell)
 Tremulant (Choir)
 Bellows Signal
 Wind Indicator
 Pedale Check
 Balanced Swell Pedal, with double action
 Swell Combination Pedal

The marked feature of this organ, contained in no other of American manufacture in New England, if we except the celebrated Tremont Temple Organ, also made by the Messrs. Hook, is the thirty-two feet Bourdon Stop giving tones low and deep beyond the power of the ear to discriminate, which are felt rather than heard.

The Case, built by J. F. Paul, Esq., from a design by Hammatt Billings, Esq., is of Black Walnut, beautiful and elaborate, with emblematical decorations, elegantly carved, and enriched with gold.

Many improvements in scales, voicing, and action appliances are here used for the first time.¹⁰

Still another organ which was constructed upon principles introduced by the Walcker instrument was placed in

¹⁰

Ibid., Vol. 24, p. 348, November 26, 1864.

the Church of the New Jerusalem in 1865. Again it was a Hook organ. There were no incomplete registers, some of the pipes were pure tin and none less than 33 per cent tin except the largest pipes made of zinc. An unusual number of mechanical registers operated by the feet were singularly silent in performance. Complete specifications were found in Dwight's Journal of Music of November 25, 1865. Mr. George J. Webb was organist at the church at that time.

Pneumatic action was used in the Hook organ purchased by the Plymouth Church, Brooklyn, New York. The tonal scheme of the organ, which was at that time the second largest in the country, was printed by Mr. Dwight on May 26, 1866, Vol. 26, p. 244, and in August of the same year two articles concerning the organ were reprinted from the New York Tribune. Plymouth Church was famous at that time because of the ministry of the Reverend Henry Ward Beecher.

The Williams Hall organ previously described, (p. 72), was moved to the Church of the Advent in 1865, and installed under the direction of Mr. Henry Carter, organist. The 1852 description of the instrument gave the pedal range as CCC to d, but now it was listed as CCC to f. Perhaps it had been augmented when erected in the new position.

As a means for making comparison of this organ with the present organ at the Advent, the stop list follows:

W. B. D. Simmons and Company

(Built in 1852)

Compass of Manuals CC to g
 Compass of Pedals CCC to f

Great Organ

16' Double Open Diapason
 8' First Open Diapason
 8' Second Open Diapason
 8' Clarabella
 8' Stopped Diapason Treble
 8' Stopped Diapason Bass
 4' Principal
 2 2/3' Twelfth
 2' Fifteenth
 Ses-quialtra (3 Rks.)
 Cornet (3 Rks.)
 Mixture (3 Rks.)
 8' Trumpet Treble
 8' Trumpet Bass
 4' Clarion

Swell Organ

16' Bourdon, Treble
 16' Double Stopped Diapason, Bass
 8' Open Diapason
 8' Stopped Diapason
 8' Dulciana
 4' Principal
 4' Flute
 2' Fifteenth
 2 Rks. Cornet
 8' Trumpet
 4' Clarionet
 8' Hautbois
 16' Double Trumpet
 Tremolo

CHAPTER 10: THE HISTORY OF THE UNITED STATES

10.1 The Early Years

10.1.1 The First Colonies

10.1.2 The American Revolution

10.1.3 The War of 1812

10.1.4 The Civil War

10.1.5 Reconstruction

10.1.6 The Gilded Age

10.1.7 The Progressive Era

10.2 The Middle Years

10.2.1 The New Deal

10.2.2 World War II

10.2.3 The Cold War

10.2.4 The Vietnam War

10.2.5 The 1960s

Choir Organ

8'	Open Diapason
8'	Stopped Diapason, Treble
8'	Stopped Diapason, Bass
8'	Dulciana
4'	Principal
2 2/3'	Twelfth
2'	Fifteenth
4'	Flute
8'	Cremona
	Fagotto

Pedal Organ

16'	Double Open Diapason
16'	Double Dulciana
16'	Ophicleide
16'	Harmonica

Couplers

Great and Swell
 Choir and Swell
 Great and Swell Super Octave
 Pedals and Great
 Pedals and Choir
 Pedals Super Octave

Design of the case, Mr. Esty¹¹
 Diapering of pipers, Mr. T. D. Morris

The new German organ, which is now being placed in the First Church in this city (Rev. Rufus Ellis's), will probably be publicly exhibited next week. This is the first German church organ set up in this city, in the building of which reference has been made rather to sound church-like qualities, than to concert effects, as in the Music Hall organ. The builders are the Messrs. Walcker.

The organ has three manuals, with a compass from CC to twice marked f, and the pedals from CC to tenor d. The

¹¹ Ibid., Vol. 25, p. 128, November 4, 1865.

Page 10

1. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

2. The second part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

3. The third part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

4. The fourth part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

5. The fifth part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

The author wishes to express his sincere thanks to the members of the staff of the Institute for their kind hospitality and to the members of the staff of the Institute for their kind hospitality.

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wind is supplied by 2 bellows and 3 feeders of unusual capacity -- want of lungs being avoided. From these are two different pressures, for the loud and soft registers of the organ, regulated by two other very large compensation bellows -- placed upon the wind canals, which are of double the usual size.

The wind chests are seven in number, and it is safe to say that no organ in the country except the Music Hall organ by the same builders has wind chests that can compare. It is the action, however, which claims chief attention.

Another important feature of this work is that there are alley-ways on each story (3 stories high), wide enough for one to walk with perfect ease to every part and pipe in the whole organ. The pipes, of which about two-thirds are metal and the other third wood, show artistic finish, the wooden pipes being of Tannenholz, a wood resembling the finest of our hard pine or spruce. Nearly all of the metal pipes are of proof tin; those in front being of pure Cornwall tin.

The keyboards are of ivory and rosewood; the draw stops of the same artistic grouping of colors, with the further improvement that the stops do not have to be pushed in by the player, but only touched, the response to which is instant. The organ has seven combination pedals, all of which are double, and some of them are sextuple in their action, a modern improvement which all organists greatly value.

Specifications

Manual I -- Hauptwerk

16'	Principal	pure tin
8'	Principal	pure tin
8'	Hohlflöte	wood
8'	Gamba	proof tin
8'	Gedekt	wood
4'	Rohrflöte	proof tin
4'	Octave	proof tin
2 2/3'	Nasard	metal
2'	Octave	proof tin
	Mixture (5 Rks.)	proof tin
8'	Trumpet	reeds and proof tin

Manual II -- Solo Organ

16'	Bordun	wood
8'	Principal	proof tin
8'	Spitzflöte	proof tin
8'	Bordun	wood
8'	Salicional	proof tin
4'	Flute d'Amour	pure tin
4'	Octave	proof tin
2'	Flautino	pure tin
	Cornet (4 Rks.)	proof tin
8'	Fagott and Clarinet	reeds and wood

Manual III -- Swell Organ

8'	Principal	proof tin
8'	Flöte	wood
8'	Liebllich Gedekt	wood
8'	Aeoline	proof tin
8'	Dolce	proof tin
4'	Fugara	proof tin
4'	Traverse Flöte	wood
2'	Piccolo	proof tin
	Cimbel (4 Rks.)	proof tin
8'	Physharmonica	free reeds

Pedale

16'	Principal	wood
16'	Violone	wood
16'	Subbass	wood
16'	Bombardon	reeds
10 2/3'	Grosse Quinte	wood
8'	Violoncello	wood
8'	Octave	proof tin
8'	Trompet	reeds and proof tin

Collectiv -- Pedale, etc.

Pedal Zum Hauptwerk
 Pedal Zum Solo Manual
 Mezzo Forte
 Volles Werk
 Coppel zur Physharmonica
 Tremolo zur Physharmonica

Section 1		
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10

Section 2		
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10

Section 3		
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10

Section 4

1

2

3

4

5

6

7

8

9

10

Volle Schellung
 Man. 2 piano
 Man. 2 forte
 Man. 1 Rohrwerk
 Coppel Man. 1 and 2
 Coppel Man. 2 and 3
 Calcant

The wind is to be furnished by a hydraulic engine.¹²

September 5th, 1874, the Hook and Hastings Company opened their sixty-fourth organ in a Boston church. This was at the Clarendon Street Baptist Church, and cost \$9,000. The power was supplied by a water motor.

Again in 1876, the same organ company installed their largest organ to date, and the largest church organ in the country in the Cathedral of the Holy Cross on Washington Street. Dwight's Journal of Music of March 4th reprinted an account from the Boston Daily Advertiser of February 23rd.

The immense nave of the Cathedral of the Holy Cross on Washington Street was occupied -- and perhaps one-third filled -- last night by a company of some thousand persons, who were present at the formal opening of the great organ just completed by Messrs. E. and G. G. Hook and Hastings. The architecture of the organ is simple but harmonious and pure in style and pleasing in impression. The instrument fills the rear and entire breadth of the gallery devoted to the choir, the shorter pipes being collected in front in seven groups surmounted by arches, while the longest go high above them on either hand at the extreme end in two towering masses, these last being connected by rows of graduated pipes defining the lower semi-circle of the great round window at the western end of the nave. The organ is the largest ever built by an American maker and is the largest in this country,

¹² Ibid., Vol. 29, p. 128, October 23, 1869, citing the Boston Transcript.

1. The first part of the paper is devoted to a general discussion of the problem of the existence of a solution of the system of equations (1) for arbitrary values of the parameters α and β .

2. In the second part of the paper, we shall consider the case when the parameters α and β are chosen in such a way that the system of equations (1) has a solution for arbitrary values of the initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions.

3. In the third part of the paper, we shall consider the case when the parameters α and β are chosen in such a way that the system of equations (1) has a solution for arbitrary values of the initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions.

4. In the fourth part of the paper, we shall consider the case when the parameters α and β are chosen in such a way that the system of equations (1) has a solution for arbitrary values of the initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions. In this case, the system of equations (1) is called a system of equations with a solution for arbitrary initial conditions.

excepting that of the Music Hall; and even in comparison with the latter, its size is not likely to be depreciated, as the proportion of speaking stops is only that of 89 to 70 in favor of the great Music Hall organ.

The description of the organ is as follows:

The instrument comprised three manuals each of 58 notes and a pedal of 30 notes, 70 speaking stops, 13 mechanical registers, including couplers; 10 pedal movements for combinations, etc., and a crescendo pedal controlling the full powers of the organ. Total number of pipes 5292.

The action is extended and reversed so that the organist may face the altar and conductor. Pneumatic motors are applied to the great manual and all its couplers, to the pedal throughout, to the basses of the swell and choir manuals, and to all the registers. All but those for the great manual are of a new device operating by "exhaust" instead of by inflation. All the combination pedals are double acting and operate without deranging combinations previously made by the registers.

There are three bellows, operated by two hydraulic motors of the largest size. The two main bellows have vertical feeders, and combined can supply nearly 5000 cubic feet of compressed air per minute, with less than 25 strokes of the motors. An extra wind pressure is used for the pedals and a portion of the great manual including the reed stops. An independent bellows supplies wind of great pressure to the "tuba mirabiles".

The organ fills the whole width of the gallery, 40 feet. It has a total depth of 25 feet and a total height of nearly 50 feet. The exterior is from the designs of the architect of the cathedral, Mr. F. C. Keely, and displays rows and groups of metallic pipes finished in gold, silver and bronze clustering around a large circular window at the centre. The cathedral has a total length of 300 feet, is 168 feet wide at the transept, and is 105 feet high from floor to apex. It has a space to be filled four and one-half times larger than the Boston Music Hall; three times larger than the Church of the Immaculate Conception, and eight times larger than the new Old South Church. By these comparisons it will be seen how great a demand is made upon the organ to produce the unusually pervading effect it does. The instrument contains nearly

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2000 more pipes than the great Plymouth Church organ of Brooklyn, hitherto the largest organ ever built in this country. Not only is this later organ pre-eminent in size, because of the number of its stops and pipes, but because these are of a superior selection, of very large scales, and of proportionately increased power.

The organists at the opening recital were Mr. S. B. Whitney from the Church of the Advent; Mr. B. J. Lang of South Congregational; Mr. L. G. Chaffin, St. Paul's Cathedral, Buffalo, New York; George E. Whiting, Music Hall Society. Compositions of Gounod, Bach, Lemmens, Schumann, Lysberg, Auber, Mendelssohn, Guilmant and Meyerbeer were used. Specifications and program were found in the Scrapbook of Francis H. Jenks at the Boston Athenaeum. Pneumatic motors were applied to the Great manual and all its couplers, and to the basses of Swell and Choir. Two hydraulic motors were used, three bellows supplying the wind pressure for the 70 stops.

The last large organ mentioned in Dwight's Journal of Music was at the Tremont Temple. This was the fourth one built by Hook and Hastings for the Temple, two of the preceding ones having been burned. This instrument was characterized by the "brilliancy of French organs and especially adapted for transcriptions of orchestral compositions." There were 15 speaking stops on the Great; 15 on the Swell; 11 on the Choir; 2 on the Solo; and 9 for Pedals. Specifications may be found in the Journal of October 23, 1880, Vol. 40,

page 175.

The Journal was discontinued in 1881. It was nearing the end of another chapter of organ building, too. Work was being done to improve the means of keeping a constant and steady wind pressure. The water motor was being supplanted by an electric motor. Electricity was also being applied to the action in an effort to eliminate the mechanical or pneumatic actions which required great physical strength to operate and were slow in responding. Organists were looking forward to an instrument which would meet any demands upon it and this instrument was soon to be realized.

CHAPTER IX

TWENTIETH CENTURY ORGANS

Two Boston organs erected in the early twentieth century have already been described. King's Chapel and Trinity Church both had organs installed by Mr. Ernest M. Skinner. Four other outstanding instruments have been chosen as typical of the best products of modern organ building.

Emmanuel Church, Newbury Street, has one of the largest Casavant organs ever built. The George Hutchings Co. rebuilt an organ for the Church in 1899, which served until 1917. Then it was rebuilt again and additions made by Casavant Brothers of St. Hyacinthe, Quebec. The old console was moved into the chapel and thirteen registers used on it. The old chancel pipes were retained but placed differently. The new Chancel Organ was the gift of many members, while the Gallery Organ was given by Mrs. Randolph Frothingham, in memory of Mr. S. Reed Anthony.

Lynnwood Farnam was organist at Emmanuel when the organ was being installed. Just before the dedication he wrote a description of the organ, in which he described the Chancel Organ as the English Cathedral type; the Gallery Organ, with its inclusion of "mixed stops", characteristic of the great "west" organs of the French Cathedral. Since 1917, the Chapel Organ has been disconnected from the very elaborate

and complicated console, which allows the organist to play the Great organ from the Choir manual, in the fashion of the French organ.

The programme of the dedicatory recital given by W. Lynnwood Farnam on January 28th, 1918 was:

HORACE WADHAM NICOLL--Paradise ("And they shall see His face")
(From "Life")

LOUIS VIERNE--Berceuse (A major)

J. S. BACH--Toccata in D (Dorian)

JOSEPH JONGEN--Improvisation-Caprice (E minor)

CH. M. WIDOR--Sixth Symphony in G (op. 42)

I. Allegro

II. Adagio

III. Intermezzo

IV. Cantabile

V. Finale

GEORGES JACOB--Selection from "Les Heures Bourguignonnes"

I. Sunrise

V. Shepherd's Song

VI. Noon

X. Song of the Wine-pressers

GEORGES KRIEGER--Toccata (E minor)

The first part of the report is devoted to a description of the experimental conditions and the results of the measurements. The second part is devoted to a discussion of the results and a comparison with the theoretical predictions.

The results of the measurements are shown in Figure 1. The theoretical predictions are shown in Figure 2. The comparison of the results with the theoretical predictions is shown in Figure 3.

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Complete specifications were:

Chancel Organ

Great Organ (15 stops)

		Feet	Pipes
	1 Double Open Diapason	16	61
x	2 Open Diapason No. 1 (lowest 12 wood)	8	61
	3 Open Diapason No. 2	8	61
	4 Open Diapason No. 3	8	61
	5 Double Flute	8	61
x	6 Stopped Flute	8	61
	7 Octave	4	61
	8 Harmonic Flute	4	61
	9 Twelfth	2 2/3	61
	10 Fifteenth	2	61
	11 Mixture	3 Rks.	183
x	12 Mixture	4 Rks.	244
	13 <u>Trombone</u> (top 19 new)	16	61
x	14 <u>Trumpet</u>	8	61
x	15 Clarion	4	61

Swell Organ (17 stops)

	16 Bourdon	16	73
	17 Violin Diapason	8	73
	18 Spitz Flute	8	73
	19 Salicional	8	73
	20 Voix Celeste (tenor C)	8	61
	21 Aeoline	8	73
	22 Stopped Flute	8	73
	23 Octave	4	73
	24 Violina	4	73
	25 Traverse Flute	4	73
	26 Piccolo	2	61
x	27 Mixture	4 Rks.	292
	28 Contra Bassoon	16	73
	29 Cornopean	8	73
	30 Oboe	8	73
x	31 Clarion	4	73
	32 Vox Humana	8	73
	Tremulant		

x indicates new stops

Italics indicate partly new stops

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Date	Description	Amount	Balance
1911	Jan 1	100.00	100.00
1912	Feb 1	50.00	50.00
1913	Mar 1	25.00	25.00
1914	Apr 1	15.00	15.00
1915	May 1	10.00	10.00
1916	Jun 1	5.00	5.00
1917	Jul 1	2.50	2.50
1918	Aug 1	1.25	1.25
1919	Sep 1	0.62	0.62
1920	Oct 1	0.31	0.31
1921	Nov 1	0.16	0.16
1922	Dec 1	0.08	0.08
1923	Jan 1	0.04	0.04
1924	Feb 1	0.02	0.02
1925	Mar 1	0.01	0.01
1926	Apr 1	0.00	0.00
1927	May 1	0.00	0.00
1928	Jun 1	0.00	0.00
1929	Jul 1	0.00	0.00
1930	Aug 1	0.00	0.00
1931	Sep 1	0.00	0.00
1932	Oct 1	0.00	0.00
1933	Nov 1	0.00	0.00
1934	Dec 1	0.00	0.00

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Choir Organ (18 stops) separate swell-box

		Feet	Pipes
	33 <u>Dulciana</u> (lowest 12 new)	16	61
x	34 <u>Open Diapason</u> (lowest 12 wood)	8	61
	35 <u>Gemshorn</u>	8	61
	36 <u>Viola di Gamba</u>	8	61
	37 <u>Dulciana</u>	8	61
x	38 <u>Unda Maris</u>	8	49
	39 <u>Melodia</u> (wood)	8	61
x	40 <u>Lieblich Gedeckt</u> (wood and metal)	8	61
x	41 <u>Gemshorn</u>	4	61
x	42 <u>Violina</u>	4	61
	43 <u>Wood Flute</u> (upper 36 new)	4	61
x	44 <u>Twelfth</u>	2 2/3	61
x	45 <u>Piccolo</u>	2	61
x	46 <u>Tierce</u>	1 3/5	61
x	47 <u>Trumpet</u>	8	61
x	48 <u>Clarinet</u>	8	61
x	49 <u>Musette</u>	8	61
x	50 <u>Clarion</u>	4	61
	<u>Tremulant</u>		

Pedal Organ (20 stops)

(5 real, 8 extension, 7 borrowed)

	51 <u>Bourdon</u>	32	12
	52 <u>Open Flute</u>	16	32
	53 <u>Open Metal</u> (Great)	16	--
	54 <u>Violone</u> (wood)	16	32
	55 <u>Bourdon</u>	16	32
	56 <u>Echo Bourdon</u> (Swell)	16	--
	57 <u>Dulciana</u> (Choir)	16	--
	58 <u>Open Flute</u> (20 from No. 52)	8	12
	59 <u>Violoncello</u> (20 from No. 54)	8	12
	60 <u>Bourdon</u> (20 from No. 55)	8	12
	61 <u>Echo Bourdon</u> (Swell)	8	--
	62 <u>Dulciana</u> (Choir)	8	--
	63 <u>Super Octave</u> (metal) independent	4	32
	64 <u>Bourdon</u> (20 from No. 60)	4	12
	65 <u>Bombarde</u> (to GGG) extension Gt.	32	5
x	66 <u>Trombone</u>	16	32
	67 <u>Bombarde</u> (Great)	16	--
	68 <u>Bassoon</u> (Swell)	16	--
x	69 <u>Tromba</u> (20 from No. 66)	8	12
x	70 <u>Clarion</u> (20 from No. 69)	4	12

x indicates new stops

Italics indicate partly new stops

Gallery Organ (all stops new except No. 109)

Great Organ (18 stops)

	Feet	Pipes
71 Contra Gamba	16	61
72 Bourdon	16	61
73 Open Diapason No. 1	8	61
74 Open Diapason No. 2	8	61
75 Stopped Flute	8	61
76 Harmonic Flute	8	61
77 Octave	4	61
78 Harmonic Flute	4	61
79 Fifteenth	2	61
80 Quint	5 1/3	61
81 Tierce	3 1/5	61
82 Twelfth	2 2/3	61
83 Tierce	1 3/5	61
84 Septieme	1 1/7	61
85 Mixture	4 Rks.	244
86 Trombone	16	61
87 Tromba	8	61
88 Clarion	4	61

Swell Organ (15 stops)

89 Bourdon	16	73
90 Open Diapason	8	73
91 Viola di Gamba	8	73
92 Voix Celeste (to B-flat)	8	63
93 Dolce	8	73
94 Stopped Flute	8	73
95 Gemshorn	4	73
96 Traverse Flute	4	73
97 Flautina	2	61
98 Sesquialtera	3 Rks.	183
99 Double Trumpet	16	73
100 Trumpet	8	73
101 Oboe	8	73
102 Clarion	4	73
103 Vox Humana	8	73
Tremulant		

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DEPARTMENT OF CHEMISTRY

Table with 4 columns: Name, Title, Address, and City. The table lists several individuals and their affiliations.

Name	Title	Address	City
Dr. J. H. Duerksen	Professor	5701 S. University Ave.	Chicago, Ill.
Dr. R. M. Waymouth	Professor	5701 S. University Ave.	Chicago, Ill.
Dr. J. K. Stille	Professor	5701 S. University Ave.	Chicago, Ill.
Dr. J. H. Duerksen	Professor	5701 S. University Ave.	Chicago, Ill.
Dr. R. M. Waymouth	Professor	5701 S. University Ave.	Chicago, Ill.
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Dr. R. M. Waymouth	Professor	5701 S. University Ave.	Chicago, Ill.
Dr. J. K. Stille	Professor	5701 S. University Ave.	Chicago, Ill.

Choir Organ (enclosed with Solo) (9 stops)

		Feet	Pipes
104	Stentorphone	8	73
105	Gross Flöte	8	73
106	Viole d'Orchestre	8	73
107	Viole Celeste (through)	8	73
108	Gemshorn (soft)	8	73
109	Quintadena (old)	8	73
110	Harmonic Flute	4	73
111	Harmonic Piccolo	2	61
112	Orchestral Oboe	8	73
	Tremulant (Choir and Solo)		

Solo Organ (enclosed) (3 stops)

113	Tuba Mirabilis	8	73
114	Cor Anglais	8	73
115	Celesta	4	61

Pedal Organ (17 stops)

(3 real, 7 extension, 7 borrowed)

116	Bourdon (lowest 7 Quint)	32	12
117	Open Flute	16	32
118	Open Metal	16	32
119	Gamba (Great)	16	--
120	Bourdon (Great)	16	--
121	Echo Bourdon (Swell)	16	--
122	Open Flute (20 from No. 117)	8	12
123	Octave Metal (20 from No. 118)	8	12
124	Bourdon (Great)	8	--
125	Echo Bourdon (Swell)	8	--
126	Open Flute (20 from No. 122)	4	12
127	Contra Trombone (extension Gt.)	32	12
128	Trombone	16	32
129	Small Trombone (Great)	16	--
130	Echo Trombone (Swell)	16	--
131	Tromba (20 from No. 128)	8	12
132	Clarion (20 from No. 131)	4	12

Chancel registers, pistons, etc., on left,
gallery on right.

Stops and couplers of Chapel Organ not included
in piston actions.

Pistons to entire affect couplers also.

The wind pressures range from $3\frac{1}{2}$ to 12 inches.

Date	Description	Amount	Balance
1890	Jan 1		
	Feb 1		
	Mar 1		
	Apr 1		
	May 1		
	Jun 1		
	Jul 1		
	Aug 1		
	Sep 1		
	Oct 1		
	Nov 1		
	Dec 1		
1891	Jan 1		
	Feb 1		
	Mar 1		
	Apr 1		
	May 1		
	Jun 1		
	Jul 1		
	Aug 1		
	Sep 1		
	Oct 1		
	Nov 1		
	Dec 1		
1892	Jan 1		
	Feb 1		
	Mar 1		
	Apr 1		
	May 1		
	Jun 1		
	Jul 1		
	Aug 1		
	Sep 1		
	Oct 1		
	Nov 1		
	Dec 1		

Total for 1890: \$100.00
 Total for 1891: \$100.00
 Total for 1892: \$100.00

Chapel Organ (5 stops) (Played from Sw.)

	Feet	Pipes
133 Open Diapason	8	61
134 Salicional	8	61
135 Melodia	8	61
136 Octave	4	61
137 Pedal Bourdon	16	27

Tablet Couplers (Chancel)

1 Chancel off Crescendo	12 Swell Sub
2 Great to Pedal	13 Swell Octave
3 Swell to Pedal	14 Swell to I Sub
4 Choir to Pedal	15 Swell to I
5 Swell Octave to Pedal	16 Swell to I Octave
6 Choir Octave to Pedal	17 Choir Sub
7 Swell to 2 Sub	18 Chancel Great to I
8 Swell to 2	19 Chancel Great off
9 Swell to 2 Octave	20 Chancel Choir off
10 Choir to 2 Sub	21 Both Organs on
11 Choir to 2	22 Gallery Organ alone

Tablet Couplers (Gallery)

23 Great to Pedal	43 Solo to I
24 Swell to Pedal	44 Solo to I Octave
25 Choir to Pedal	45 Choir Sub
26 Solo to Pedal	46 Choir Octave
27 Swell to Pedal Octave	47 Great to Solo
28 Solo to Pedal Octave	48 Swell to Solo
29 Swell to 2 Sub	49 Choir to Solo
30 Swell to 2	50 Solo Sub
31 Swell to 2 Octave	51 Solo Octave
32 Choir to 2 Sub	52 Gallery Great to I
33 Choir to 2	53 Gallery Great off
34 Solo to 2 Sub	54 Choir off
35 Solo to 2	55 Great and Pedal combinations coupled
36 Solo to 2 Octave	56 Gallery off Crescendo
37 Solo to Swell	57 Celesta Sub
38 Swell Sub	Chapel (Drawstops)
39 Swell Octave	58 Chapel to Pedal
40 Swell to I Sub	59 Chapel to 2
41 Swell to I	60 Chapel Octave
42 Swell to I Octave	

The first of these is the *Journal of the Proceedings of the General Assembly of the Church of Scotland*, which is published annually, and contains a full and complete account of all the proceedings of the Assembly, from the opening of the Session to the closing of the same. It is a most valuable and interesting work, and is highly recommended to all who are desirous of becoming acquainted with the internal history of the Church of Scotland.

The second of these is the *Annals of the Church of Scotland*, which is published annually, and contains a full and complete account of all the proceedings of the Church, from the opening of the Session to the closing of the same. It is a most valuable and interesting work, and is highly recommended to all who are desirous of becoming acquainted with the internal history of the Church of Scotland.

The third of these is the *Register of the General Assembly of the Church of Scotland*, which is published annually, and contains a full and complete account of all the proceedings of the Assembly, from the opening of the Session to the closing of the same. It is a most valuable and interesting work, and is highly recommended to all who are desirous of becoming acquainted with the internal history of the Church of Scotland.

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Accessories

Adjustable Hand-Pistons

Gallery

Eight to Great
 Five to Swell
 Three to Choir
 Two to Solo
 Three to Pedal
 Two to Couplers
 Three to Entire

Chancel

Eight to Great
 Six to Swell
 Six to Choir
 Three to Pedal
 Two to Couplers
 Three to Entire

Reversible Hand-Pistons

Gallery

Great to Pedal
 Swell to Pedal
 Choir to Pedal
 Solo to Pedal

Chancel

Great to Pedal
 Swell to Pedal
 Choir to Pedal

Adjustable Foot-Pistons

Gallery

Three to Pedal
 Three to Entire

Chancel

Three to Pedal
 Three to Entire

Reversible Foot-Pistons

Gallery

Great to Pedal
 Bourdon 32
 Trombone 32

Chancel

Great to Pedal
 Bourdon 32
 Bombarde 32

Three pistons to entire Chancel and Gallery, including couplers (non-movable, with indicators).

Combination Foot-Pistons

Chancel Organ alone
 Both organs
 Gallery Organ alone
 Chapel on hand-piston

Appendix

Table 1

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Table 2

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Table 3

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Table 4

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Release Pistons

All manual 16-ft. stops) both
All sub couplers) organs
All 32 and 16-ft. pedal stops)
Gallery General Release
Chancel General Release
Adjuster piston (Gallery)
Adjuster piston (Chancel)

Indicators

Three for non-movable pistons
Three to release pistons
Chancel wind
Gallery wind
Chapel wind
Chancel crescendo
Gallery crescendo
Chapel on

Balanced Swell Pedals

Chancel Choir
Chancel Swell and Chapel
Gallery Swell
Gallery Choir and Solo
Crescendo (both organs)

Hutchings, Plaisted and Company installed the new Old South Church organ in 1876. This was a large three manual instrument with a 30 note pedale, and cost \$15,000. It was rebuilt by the Skinner Organ Company in 1915.

The specifications are:

SPECIFICATIONS OF THE ORGAN IN THE

OLD SOUTH CHURCH, BOSTON

Built by The Ernest M. Skinner Co., Boston, Mass.

Great Organ

16' Diapason
 16' Bourdon
 8' First Diapason
 8' Second Diapason
 8' Third Diapason
 8' Gamba
 8' Erzähler
 8' Philomela
 8' Claribel Flute
 4' Flauto Traverso
 4' Octave
 2 2/3' Quint
 2' Fifteenth
 3 Rks. Mixture
 16' Ophicleide)
 8' Tuba) In solo Box
 4' Clarion)
 Cathedral chimes -- 25 notes

Swell Organ

16' Dulciana
 16' Bourdon
 8' Diapason
 8' Spitzflöte
 8' Flute Celeste
 8' Salicional
 8' Voix Celestes
 8' Aeoline
 8' Unda Maris
 8' Clarabella
 8' Gedeckt
 4' Octave
 4' Violina
 4' Flute
 2' Flautino
 3 Rks. Mixture
 16' Contra Posaune
 8' Cornopean
 8' Oboe
 8' Vox Humana
 4' Clarion
 Tremolo

Choir Organ

16' Gamba
 8' Open Diapason
 8' Dulcet -- 2 Rks.
 8' Kleine Erzähler -- 2 Rks.
 8' Gemshorn
 8' Concert Flute
 8' Quintadena
 4' Flute
 4' Fugara
 2' Piccolo
 8' Clarinet
 8' Physharmonica
 8' Celesta)
 Celesta sub)
 Tremolo)

Solo and Echo Organs

8' Philomela
 8' Gamba
 8' Gamba Celeste
 8' Harmonic Flute
 4' Flute
 16' Fagotto
 8' Corno D'Bassetto
 8' English Horn
 8' Orchestral Oboe
 8' Flügel Horn
 8' French Horn
 16' Ophicleide) Extension Chorus Reed --
 8' Tuba) Interchangeable with Great
 4' Clarion)
 8' Tuba Mirabilis
 16' Bourdon)
 8' Diapason)
 8' Gross Flute)
 8' Voix Celestes) At other end of
 8' Salicional) building
 4' Flute)
 8' Fagotto)
 Carillons)
 Tremolo)

THEORY

The first part of the theory is the definition of the function $f(x)$ and the function $g(x)$. The function $f(x)$ is defined as the function which is continuous at x and the function $g(x)$ is defined as the function which is continuous at x . The function $f(x)$ is defined as the function which is continuous at x and the function $g(x)$ is defined as the function which is continuous at x .

THEORY

The second part of the theory is the definition of the function $f(x)$ and the function $g(x)$. The function $f(x)$ is defined as the function which is continuous at x and the function $g(x)$ is defined as the function which is continuous at x . The function $f(x)$ is defined as the function which is continuous at x and the function $g(x)$ is defined as the function which is continuous at x .

Pedal Organ

32' Bourdon
 32' Violone
 16' Diapason
 16' Violone
 16' Gamba
 16' Dulciana
 16' Bourdon
 16' Echo Lieblich
 8' Octave
 8' Gedeckt
 8' Still Gedeckt
 8' 'Cello
 32' Bombarde
 16' Ophicleide
 16' Posaune
 16' Fagotto
 8' Tromba
 4' Clarion
 Cathedral chimes -- 25 notes

Couplers

Swell to Great)
 Swell to Choir)
 Choir to Great) Unison
 Solo to Great)
 Solo to Choir)
 Great to Solo)

Swell super)
 Swell sub)
 Swell to Great Super)
 Swell to Great sub)
 Choir super) Octave
 Choir sub)
 Solo super)
 Solo sub)
 Solo to Great Super)
 Solo to Great sub)

Swell to Pedal)
 Great to Pedal)
 Choir to Pedal) Pedal
 Solo to Pedal)
 Swell to Pedal)
 4'

General cancel
Octave coupler cancel

Combinations

Adjustable at the console and visibly operating the
Draw stop knobs.

Swell -- 1, 2, 3, 4, 5, 6, 7 -- On and Off Ped. to Man.
Great -- 1, 2, 3, 4, 5, 6, 7 -- On and Off Ped. to Man.
Choir -- 1, 2, 3, 4, 5, 6, 7 -- On and Off Ped. to Man.
Solo -- 1, 2, 3, 4, 5, 6, 7 -- On and Off Ped. to Man.
Pedal -- 1, 2, 3, 4, 5, 6, 7 -- On and Off Ped. to Man.
Full -- 1, 2, 3, -- Connect all combinations numbered
4, 5, 6, and 7.

Pedal 1 connects Diapasons
Pedal 2 connects Reeds
Pedal 3 connects Flutes
Pedal 4 connects Strings

Swell combination pistons duplicated by pedals.

Pedal combinations to operate Great combinations when
Great combinations operate Pedal combinations.

Balanced Swell

Balance Choir and Solo

Balanced Crescendo

Reversible Great to Pedal

Sforzando

Solo, Swell, Great to Pedal and Swell to Great affected
by Reversible pistons.

The action electro pneumatic.

Another Skinner installation is at the First Church in
Boston. Historically the church is important because it was
during its early organization that an organ was first used in
a Congregational service in Boston. Another of its organs

August 1880

August 1880

August 1880

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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attracted a great deal of attention as it was built by the Walcker Organ Company of Germany. This organ has been described in Chapter VIII of this paper.

The present organs are both played from the same console and complete specifications are:

First Church of Boston

Ernest M. Skinner Company

Compass of manuals C -- C⁴₃
 Compass of pedals C -- g³

Chancel Organ

Great

16' Bourdon (Pedal)
 8' First Diapason
 8' Second Diapason
 8' Third Diapason
 8' Erzähler
 8' Wald Flute
 8' Rohr Flute (Swell)
 8' String Celeste
 8' Aeoline (Swell)
 4' Harmonic Flute
 4' Flute (Swell)
 4' Octave
 2' Fifteenth
 5 Rks. Mixture
 16' Contra Posaune
 8' Tromba
 4' Clarion
 8' Cornopean (Swell)
 8' Philomela (Pedal)
 Chimes
 Tremolo

Swell

16' Bourdon
 8' Diapason
 8' Rohr Flute
 8' Salicional
 8' Spitz Flute
 8' Voix Celeste
 8' Unda Maris
 8' Aeoline
 8' Flute Celeste
 4' Octave
 4' Flute
 2' Fifteenth
 3 Rks. Mixture
 16' Contra Posaune
 8' Cornopean
 8' Flugel Horn
 4' Clarion
 8' Vox Humana
 Tremolo

Choir

8' Geigen Principal
 8' Concert Flute
 8' Gamba
 4' Flute
 2 2/3' Nazard
 1 3/5' Tierce
 8' Orchestral Oboe
 8' Clarinet
 Celesta
 Harp
 Tremolo

Solo

8' English Horn
 8' French Horn
 8' Gross Gamba
 8' Gamba Celeste
 8' Orchestral Flute
 8' Philomela (Pedal)
 8' Tuba
 4' Clarion
 Chimes
 Tremolo

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Pedal

16' Diapason
 16' First Bourdon
 16' Second Bourdon (Swell)
 16' Violone
 8' Gedeckt
 8' Gamba
 8' Still Gedeckt (Swell)
 8' Octave
 10 2/3' Quint
 32' Bombarde
 16' Trombone
 16' Posaune (Swell)
 8' Tromba
 Chimes

Nave Organ

Great

16' Diapason
 8' First Diapason
 8' Second Diapason
 8' Third Diapason
 8' Gamba
 8' Melodia
 8' Gamba Celeste
 8' Gemshorn
 4' Wald Flute
 4' Octave
 2' Fifteenth
 3 Rks. Harmonics
 16' Trumpet
 8' Trumpet
 4' Clarion

Swell

16' Bourdon
 8' Diapason
 8' Stopped Diapason
 8' Salicional
 8' Spitz Flute
 8' Aeoline
 8' Flute Celeste
 8' Voix Celeste

4' Octave
 4' Flute
 2' Flautino
 3 Rks. Mixture
 16' Fagotto
 8' Cornopean
 4' Clarion
 8' Oboe
 8' Vox Humana
 Tremolo

Choir

16' Dulciana
 8' Violin Diapason
 8' Dulciana
 8' Concert Flute
 8' Unda Maris
 4' Rohr Flute
 4' Dulciana
 2' Piccolo
 8' Clarinet
 Tremolo

Pedal

32' Bourdon
 16' Diapason
 16' Bourdon
 16' Violone
 16' Gedeckt (Swell)
 8' Gedeckt
 8' Flute
 8' Violoncello
 10 2/3' Quint
 16' Trombone
 8' Tromba

Accessories

Adjustable Hand-Pistons

Chancel

Seven to Great
 Eight to Swell
 Six to Choir
 Six to Solo
 Two to Couplers
 Four to Entire

Nave

Six to Great
 Six to Swell
 Six to Choir
 Two to Couplers
 Three to Entire

Adjustable Foot-Pistons

Chancel

Seven to Pedal
 Five to Entire

Nave

Six to Pedal
 One to Entire

Reversible Hand-Pistons

Pedal to Manuals (both organs)
 Swell to Pedal (both organs)
 Great to Pedal (both organs)
 Choir to Pedal (both)
 Solo to Pedal (Chancel)
 Nave Organ alone (on each manual and pedal)
 Chancel Organ alone (on each manual and pedal)
 Both Organs (on each manual and pedal)
 2' and Mixture (Nave)
 16' Manual Stops (Nave)
 All Swells (Nave)

Tablet Couplers

Chancel

Great to Pedal
 Swell to Pedal
 Choir to Pedal
 Solo to Pedal
 Swell Octave to Pedal
 Solo Octave to Pedal
 Swell to Great Sub
 Swell to Great
 Swell to Great Octave

Choir to Great Sub
 Choir to Great
 Choir to Great Octave
 Swell Sub
 Swell Octave
 Swell to Choir
 Swell to Solo
 Choir Sub
 Choir Octave
 Great Sub
 Great Octave
 Great to Solo
 Solo Sub
 Solo Octave
 Solo to Great Sub
 Solo to Great Octave
 Chancel Organ alone
 Both Organs on

Nave

Great to Pedal
 Swell to Pedal
 Choir to Pedal
 Swell to Pedal Octave
 Swell to Great Sub
 Swell to Great
 Swell to Great Octave
 Choir to Great Sub
 Choir to Great
 Choir to Great Octave
 Swell Sub
 Swell Octave
 Swell to Choir
 Swell to Solo
 Great to Solo
 Choir Sub
 Choir Octave
 Great to Choir
 Nave Organ alone

Reversible Foot-Pistons

Chancel

Great to Pedal
Solo to Pedal
Solo to Great
Sforzando

Nave

Great to Pedal
Sforzando

Release Pistons

Chancel General
Nave General

Balanced Swell Pedals

Chancel Swell
Chancel Solo
Chancel Crescendo
Both Organs Choir
Nave Swell
Nave Crescendo

Indicators

Chancel Sforzando
Nave Sforzando

Chapel Piano
Chapel Forte

The newest organ in a Boston church is at the Church of the Advent on Brimmer Street, where Frederick Johnson is organist. The old Hutchings organ was almost completely scrapped and the new Aeolian-Skinner installed in 1936. This is the only example in Boston of the Rück-positif addition to the organ.

The console comprises a complete set of couplers as usually found on an organ of this size, together with an adequate supply of general pistons to the individual departments and some reversibles for the manual to pedal and intermanual couplers.¹

Aeolian-Skinner Organ Company
Inc.

Specification of an Organ prepared for

Church of the Advent
Boston, Mass.

V-57. R-76. S-60. B-3. P-4581.

Great

3ⁿ: V-12. R-21. S-12.

Unexpressive

Pipes

16'	Diapason	61
8'	Principal	61
8'	Diapason	61
8'	Gemshorn	61
8'	Flute Harmonique (Cavaille-Col)	61
5 1/3'	Quint	61
4'	Octave	61
4'	Principal	61
2 2/3'	Twelfth	61
2'	Fifteenth	61
	Furniture (IV Rks.) 12-15-19-22	244
	Cymbel (II Rks.) 26-29	122

Swell

3⁵/₄ⁿ: V-17. R-21. S-17.

16'	Lieblich Gedeckt	73
8'	Geigen	73
8'	Stopped Diapason	73
8'	Viole de Gamba	73
8'	Voix Celeste	73

¹ Letter from G. Donald Harrison, president of Aeolian-Skinner Company, May 11, 1944.

Pipes

8'	Echo Salicional	73
4'	Octave Geigen	73
4'	Flauto Traverso	73
4'	Fugara	73
2'	Fifteenth	61
	Grave Mixture (III Rks.) 12-15-19	183
	Plein Jeu (III Rks.) 22-26-29	183
16'	Bombarde	73
8'	First Trompette	73
8'	Second Trompette	73
4'	Clarion	73
8'	Vox Humana	61
	Tremolo	

Choir

3 $\frac{3}{4}$ " : V-15. R-18. S-15.

8'	Viola (broad String)	73
8'	Orchestral Flute	73
8'	Dulciana	73
8'	Unda Maris	61
4'	Koppel Flöte	73
2'	Zauber Flöte	61
8'	Clarinet	73
	Tremolo	
	Unexpressive	
8'	Trompette 4" w	73

Ruck-Positif

(Playable from Choir or Great)

(Unenclosed and on very light pressure and in prominent position)

2 $\frac{1}{2}$ "

Unexpressive

8'	Rohrflöte	61
4'	Principal	61
2 2/3'	Quint	61
2'	Blockflöte	61
1 3/5'	Tierce	61
1'	Sifflöte	61
	Scharf (III Rks.) 22-26-29	183

Pedal

Pipes

4 ⁿ :	V-13.	R-16.	S-16.	
32'	Contre Bourdon FFFF (Old Wood			
	Diapason Stopt)			7
	(Resultant below FFFF)			
16'	Principal (Metal)			32
16'	Contre Basse (Wood)			32
16'	Bourdon			32
16'	Lieblich Gedeckt (Swell)			
8'	Principal (Metal)			32
8'	Flute Ouverte (Wood)			32
8'	Still Gedeckt (Swell)			
5 1/3'	Octave Quint			32
4'	Super Octave			32
4'	Flute Harmonique			32
	Mixture (III Rks.) 17-19-22			96
	Fourniture (II Rks.) 26-29			64
16'	Bombarde			32
8'	Trompette			32
4'	Clarion			32

CHAPTER X

LITURGICAL USES OF THE ORGAN

Accepting the definition of the term liturgy as the administration of public worship in general,¹ it was a little difficult to establish the date of the first liturgical use of the organ. Grove's Dictionary quotes Julianus, a Spanish bishop around A.D. 450, who claimed that it was in common use in the churches of Spain at that time. Grove also gives the information that the organ was used in religious worship by Pope Vitalian at Rome about 666, to improve the singing of the congregations. Saint Ambrose (340-397) used instruments of music in the public services at Milan, and as an organ capable of use in the church service was made before Christian churches, it is quite safe to assume that it had been used early. It cannot be doubted that by the end of the sixth century, the organ was being used before and after church services, like the bells, as a means of attracting congregations. The large organs built at this time, before it was possible to obtain any diminution from the tonal effect of full organ, certainly could not have been used to accompany small

¹ H. Augustine Smith, Outlines, for use in Fine Arts in Religion, Boston University, 1944.

groups of singers. With the beginning of congregational singing of the Lutheran chorales in the sixteenth century, a great body of controlled tone was necessary for accompaniment. This aroused the German organ builders, and may have been one of the factors contributing to the more rapid progress of organ building in Germany than in England.

In spite of its almost constant use since it first appeared in religious service, the organ has been strongly opposed as an instrument to aid worship. The earliest objections may be found in "Les Pères de l'Eglise et la Musique", by Dr. Théodore Gérold, of the University of Strasburg (Alcan, Paris, 1931). After the introduction of harmony, Ethelred, Abbot of Rievaulx Abbey, Yorkshire, born about 1109; died about 1166, had the following to say:

Let me speake now of those who, under the show of religion, doe obpolliate the business of pleasure. . . . Whence hath the Church so many Organs and Musicall Instruments? To what purpose, I pray you, is that terrible blowing of Belloes, expressing rather the crakes of Thunder, than the sweetness of a voyce? To what purpose serves that contradiction and inflection of the voyce? This man sings a base, that a small meane, another a treble, a fourth divides and cuts asunder, as it were, certain middle notes. One while the voyce is strained, anon it is remitted, now it is dashed, and then againe it is enlarged with a lowder sound. Sometimes, which is a shame to speake, it is enforced into a horse's neighings; sometimes, the masculine vigour being laid aside, it is sharpened into the shrilnesse of a woman's voyce; now and then it is writhed, and retorted with a certaine artificiall circumvolution. Sometimes thou may'st see a man with an open mouth, not to sing, but, as it were, to breathe

out his last gaspe, by shutting in his breath, and by a certaine ridiculous interception of his voyce, as it were to threaten silence, and now againe to imitate the agonies of a dying man, or the extasies of such as suffer. . . . In the meantime, the common people standing by, trembling and astonished, admire the sound of the Organs, the noise of the Cymballs and Musicall Instruments, the harmony of the Pipes and Cornets.²

In 1516 this was followed by the denouncement of Erasmus.

They chant nowadays in our churches in what is an unknown tongue and nothing else, while you will not hear a sermon once in six months telling people to amend their lives. Modern church music is so constructed that the congregation cannot hear one distinct word. The choristers themselves do not understand what they are singing, yet according to priests and monks it constitutes the whole of religion. . . . In college or monastery it is still the same music, nothing but music. . . . Money must be raised to buy organs and train boys to squeal, and learn no other thing that is good for them.³

Each succeeding generation had its objectors to music in church. In 1583 Robert Browne in England wrote in his True and Short Declaration:

Their tossing to and fro of psalmes and senteces is like tenisse plaie, whereto God is called to Judg who can do best and be most gallant in his worship: as bie organs, solfaing, pricksong, chanting, bussing and mumbling verie roundlie, on divers handes. Thus thei have a shewe of religion, but indeed thei turne it to

² Prynne, Histrionastix, Chapter XX, cited by Percy A. Scholes, The Puritans and Music, p. 215.

³ Erasmus, Greek Testament, 1516, cited by Percy A. Scholes, op. cit., p. 216.

gaming, and plaie mock holidae with the worship of God.⁴

In spite of this feeling against the use of organs in England, the Lansdowne Mss⁵ mentions organs used in eleven Cathedrals. Another manuscript tells of organs in Bristol.

In her wee found (besides that fayre and strong fabricke of the Cathedrall, which was newly finish'd) 18 churches, which all are fayrely beautify'd, richly adorn'd, and sweetly kept; and in the major part of them are neat, rich and melodious organs, that are constantly play'd on. In the Cathedrall are rich organs, lately beautify'd and indifferent good quiristers.

The Pilgrims landing at Plymouth in 1620, the Puritans settling Salem in 1628, and the Boston group under the guidance of John Winthrop in 1630 all had left a country where the feeling against the use of organs in church was rising to a climax. It was in 1644 that the Ordinance against all monuments of Idolatry was enacted. This decreed that "all organs and the frames or cases wherein they stand in all churches and chappels shall be taken away and utterly defaced, and none hereafter set up in their places." The first part of the Ordinance was carried out. Angry mobs and soldiers destroyed some of the organs, some were dismantled and sold, others remained in place but silent. Upon the

⁴ Robert Browne, True and Short Declaration, cited by Percy A. Scholes, op. cit., p. 217.

⁵ Lansdowne Collection, No. 213, folio 315, also folios 317-48, cited by Percy A. Scholes, op. cit., p. 229.

Restoration of Charles II in 1660, the organs began to be replaced.

It is not surprising then, that the first New England colonists did not immediately import organs for their churches. They had come to this country with very definite ideas of the distinction between instrumental music for social enjoyment in the home, and instrumental music in church. The first, they did not oppose; the latter was strictly forbidden. In addition to this, the expense of importing organs for any purpose was at first prohibitive.

The accepted Puritan doctrine in New England concerning instrumental accompaniment in church was expounded by John Cotton in Boston in 1647:

Singing with Instruments was typicall, and so a ceremoniall worship and therefore is ceased. But singing with heart and voyce is a morall worship, such as is written in the heart of all men by nature: as to pray in distresse, so when we are merry and have cause of solemne thanksgiving unto God, then to sing Psalmes, which the Holy Ghost by the Apostle James approveth and sanctifieth, James 5, 13. Or supposing singing with instruments were not typically, but onely an externall solemnitie of worship, fitted to the solace of the outward sences of children under age (such as the Israelites were under the Old Testament, Gal. 4, 1, 2, 3) yet now in the growne age of the heirs of the New Testament, such externall pompous solemnities are ceased and no externall worship reserved, but such as holdeth forth simplicitie, and gravitie; nor is any voyce now to be heard in the Church of Christ, but such as is significant and edifying by signification (1 Cor. 14, 10, 11, 26) which the voyce of instruments

THE UNIVERSITY OF CHICAGO

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OFFICE OF THE CURATOR
OF THE MUSEUM OF ART AND ARCHITECTURE
CHICAGO, ILLINOIS

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CHICAGO, ILLINOIS

is not.⁶

However, the unaccompanied singing at the church services soon became intolerable. Even before Cotton's publication, Thomas Lechford in Plaine Dealing or Newes from New England,⁷ had pleaded for better music in church. It was in 1642 that he wrote:

If Psalms and Hymnes and spirituall songs are to be sung in the Church, and to sing melodiously, and with good harmony, is the gift of God, the uncomely singing a kind of sin in the holy Assemblies; why should not the church leader and rulers of the church, appoint some in their stead, to take care of the singing of the Church? And, may not some be fitting to lead in singing the others? And lest they may fall out of their tunes to jarring, why may they not use the help of some musical instruments? And lest they should want able men this way, why should they not take care that some children be trained up to musique?

So it followed that improvements were made. The first steps were the elimination of the "lining out" of the psalms and the beginning of singing societies. For the story of the first organ in a Boston church see page 23 in Chapter IV.

The Brattle Street Church was the first church in Boston which did not follow the Anglican service to make a step in the direction of better music. They stopped "lining out" on December 20, 1699, and established a singing society

⁶ Cited by Percy A. Scholes, op. cit., pp. 246-47.

⁷ Reprinted in the Collection of the Massachusetts Historical Society, 3rd Series, Vol. iii, 1833, cited by Percy A. Scholes, op. cit., p. 247.

1870

The first of the year was a very dry one, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought.

The second of the year was a very wet one, and the crops were much injured by the rain. The weather was very cold, and the crops were much injured by the rain. The weather was very cold, and the crops were much injured by the rain.

The third of the year was a very dry one, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought. The weather was very hot, and the crops were much injured by the drought.

The fourth of the year was a very wet one, and the crops were much injured by the rain. The weather was very cold, and the crops were much injured by the rain. The weather was very cold, and the crops were much injured by the rain.

between 1717-1724.⁸ In the surrounding towns, choirs were growing from the singing societies which taught people to read by note. In Rowley, shortly after 1730 an effort was made "to collect those who sang to-gether on the Sabbath."⁹ These singers were not given separate seats until thirty or forty years later. In 1762, the Rowley parish voted to allow those who had learned the art of singing to have the liberty of sitting in the front gallery. They did not take the liberty, probably because they could not sing after the clerk's reading. By 1785, it was recorded that the Parish wanted the singers, both male and female, to sit in the gallery, and would allow them to sing once upon each Lord's day, without reading by the Deacon. The choir was established at Ipswich before this as Felt's History of Ipswich states that in 1773 "the seats for the choir were designated by the First Parish in Ipswich, being two back on each side of the front alley."¹⁰ The main objection to the "regular" singing of such groups was that the "Practice leads to the Church of England and will bring in Organs quickly."¹¹

⁸ Caleb H. Snow, A History of Boston, p. 204.

⁹ George Hood, History of Music in New England, p. 181.

¹⁰ George Hood, op. cit., p. 182.

¹¹ Henry W. Foote, Three Centuries of American Hymnody, p. 108.

Organs did come, although not quickly, and by the beginning of the nineteenth century were having a definite part in the church service as the accompanying instrument.

The Universal Church, which had been Samuel Mather's Church, on North Bennett Street, had an organ in use in 1793. After the installation of Mr. Murray there "followed singing with the organ".¹² On October 19th, we also learn from The Columbian Centinel that a choir of choice singers would perform an Occasional Funeral Anthem at the Brattle Street Church on the 21st of November. This was to be done under the direction of their organist, Hans Gram, who had written the anthem, probably in memory of John Hancock, who had recently died. The organ at the Brattle Street Church had cost 500 pounds and was first used in 1790. It was only used to accompany the singing. No interludes were permitted and no symphonies at the opening and close of worship. The organ was only an assistant to the vocal music of psalmody which was held to be an important part of public worship. It was said that, when the vessel containing the organ arrived in the harbor, a wealthy gentleman of the parish, who had refused to subscribe for it, waited upon the minister and offered to pay into the treasury of the Church, for the benefit of the poor,

¹² The Columbian Centinel, October 23, 1793.

the whole cost of the organ and freight, if he would have it thrown overboard below the lighthouse.¹³

As late as 1814 there was no organ at the Park Street Church. The accompaniment to the singing was provided by a flute, a bassoon, and a violoncello.¹⁴

The King's Chapel Liturgy collected from the Book of Common Prayer, and published in 1828, allowed the organ to be used just before the reading of the First Lesson. The Rubric following the reading of the anthem or psalm "Then may follow a Voluntary on the Organ; after which the First Lesson is to be read."

Trinity Church, too, allowed the organ to be used in addition to accompanying the voices. A short biography of Dr. George K. Jackson, organist at Trinity sometime between 1815-20, was given in Parker's Musical Biographies.

Anyone acquainted with the true style of Organ playing must acknowledge his unrivalled talents, his voluntaries were elaborate and replete with chromatic harmonies, embracing the most scientific and classic modulations. His interludes to psalmody were particularly appropriate to the sentiments expressed in the subject, and until his residence in the metropolis of New England, chanting the church service was little practiced and less understood.

For further information about Dr. Jackson and his voluntaries the History of the Handel and Haydn Society supplies

¹³ Massachusetts Historical Society, Proceedings, Vol. XLVII, p. 228.

¹⁴ John S. Dwight, "Music", The Memorial History of Boston, Vol. 4, Part II, p. 417.

the first of these is the fact that the first of the two

is the only one which is not a member of the

second class, and the second is the only one which

is not a member of the first class, and the third

is the only one which is not a member of either

of the two classes, and the fourth is the only one

which is a member of both classes, and the fifth

is the only one which is not a member of either

of the two classes, and the sixth is the only one

which is a member of both classes, and the seventh

is the only one which is not a member of either

of the two classes, and the eighth is the only one

which is a member of both classes, and the ninth

is the only one which is not a member of either

of the two classes, and the tenth is the only one

which is a member of both classes, and the eleventh

is the only one which is not a member of either

of the two classes, and the twelfth is the only one

which is a member of both classes, and the thirteenth

is the only one which is not a member of either

of the two classes, and the fourteenth is the only one

which is a member of both classes, and the fifteenth

is the only one which is not a member of either

of the two classes, and the sixteenth is the only one

which is a member of both classes, and the seventeenth

is the only one which is not a member of either

of the two classes, and the eighteenth is the only one

which is a member of both classes, and the nineteenth

the following:

When Dr. Gardiner requested him to shorten his voluntaries, and he replied by advising the reverend gentleman to curtail his sermons. On the following Sunday, he gave vent to his ill humour by picking out the psalm tunes with one finger, and on Easter Sunday, in assertion of his dignity as sufficient to exempt him from interference, appeared in the choir attired in the dress of an English Doctor of Music, with plum-colored coat, yellow breeches and a square cap. This filled the measure of his offences and brought about the acceptance of his resignation.¹⁵

The organ was becoming more popular even in the non-liturgical churches all through the nineteenth century, and in sharp contrast to the limited use of the instrument at the Brattle Street Church during the first part of the century, the following excerpt from the Boston Transcript dated December 17, 1873 shows how it was used at the end of the century.

The new Brattle Church (Rev. Dr. Lothrop's) cor. of Commonwealth Ave. and Clarendon St., which is to be publicly dedicated next Monday evening; was thrown open last evening for a trial of the new organ. The instrument was built by Messrs. E. and G. G. Hook and Hastings and ranks among the largest in the country

Mr. S. B. Whitney played

Fugue	--	Bach
Canon	--	Merkel
Offertoire	--	Reed

The Prelude and Finale were from Gounod's Faust.

¹⁵ Charles C. Perkins, History of Handel and Haydn Society, Vol. I, p. 49.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
JANUARY 1950

TO THE HONORABLE CHAIRMAN OF THE BOARD OF TRUSTEES
OF THE UNIVERSITY OF CHICAGO
FROM THE DEPARTMENT OF CHEMISTRY

THE DEPARTMENT OF CHEMISTRY
HAS THE HONOR TO ACKNOWLEDGE
THE RECEIPT OF YOUR LETTER
OF JANUARY 10, 1950

AND TO INFORM YOU THAT
THE MATTER HAS BEEN
RECEIVED BY THE
APPROPRIATE COMMITTEE

AND WILL BE CONSIDERED
AT THE NEXT MEETING

Dudley Buck played

Allegro-Sonata	Van Eyken
Concert variations on Last Rose	
of Summer	arr. Buck
Overture-Tannhauser	Wagner
Rondo Grezioso	Spohr

The organ solos were pleasantly interspersed by singing.

The Episcopal churches and King's Chapel where the Anglican service was used, were the early leaders in the best use of the organ in worship. At the Church of the Advent, where boys and men were first used in a Boston choir, the music was notable for its beauty and simplicity. The organ was played as an accompaniment rather than leading the singers, and a writer in the Parish Choir, an English publication, in 1847 said: "In Boston, at the Church of the Advent . . . the singing is better than any I have ever heard on this side of the Atlantic."¹⁶ It was at the Church of the Advent, too, where a choir procession with organ was first used in 1859, before and after the service, and dignity added with the use of vestments. In 1852 the Antiphonal mode of performing the Choral service was first used in Boston at the Church of the Advent. The musical standard was kept high and was one of the "attractive features of the service, rather from its eccle-

¹⁶ F. E. Oliver and Others, A Sketch of the History of the Parish of the Advent, p. 32.

siastical character than from any special merit on the part of the singers."¹⁷

A newspaper article dated April 16, 1873 gives the following description of the music and use of the organ at the Advent during the last of the century.

On Sunday preceding Lent we visited the Church of the Advent, Bowdoin St., where the English Cathedral service prevails in a completeness not to be found elsewhere in Boston. At the Messiah, it is nominally the same, but the musical standard of the Advent is considerably in advance of its coadjutor.

.....

Mr. S. B. Whitney is organist here and gives a creditable voluntary, interludes, etc., but plays in general altogether too loud, using the pedals so indiscriminately as to greatly mar the effects of the singing, and producing a strange waving sound really painful to the ear. It is a mistake, we think, to separate the organ so far from the choristers; the organist is at a disadvantage, and the instrument does not blend with the voices.

.....

The music from organ and singers is incessant throughout the Communion service and very elaborate withal. On the Sunday spoken of a Te Deum, Benedictus, Kyrie, Sanctus, Agnus Dei, and the Nicene Creed and Glorias were by Tours; a very beautiful Introit by MacFarren; and the processional hymn being the only interpolation we believe.¹⁸

Educated musicians and people interested in church music were thinking and writing a great deal about the best use of the organ in the service, during the nineteenth century.

¹⁷ Ibid., p. 20.

¹⁸ Scrapbook, Vol. I, No. 121, found in the Bostonian Society Library at the Old State House, Boston.

1. The first part of the paper is devoted to a general discussion of the problem.

2. In the second part, we consider the case of a single particle.

3. The third part is devoted to the case of a system of particles.

4. In the fourth part, we consider the case of a system of particles with interactions.

5. The fifth part is devoted to the case of a system of particles with interactions and a magnetic field.

6. In the sixth part, we consider the case of a system of particles with interactions and a magnetic field, and a chemical potential.

7. The seventh part is devoted to the case of a system of particles with interactions and a magnetic field, and a chemical potential, and a temperature.

8. In the eighth part, we consider the case of a system of particles with interactions and a magnetic field, and a chemical potential, and a temperature, and a pressure.

In the publications of that period was found a constant crusade against low standards of church music and poor organ playing. Church services were reviewed in music magazines as to-day secular concerts are given public criticism. Editorials and articles by leading organists and ministers all pleaded for a revival of "religious music". Two articles have been selected as the best representatives of the many articles and are given here. Both were selected from Dwight's Journal of Music; the first, dated May 17, 1856:

A musical service, by the Choir of St. Paul's Church, under the direction of Dr. S. P. Tuckerman, took place at the Church on Wednesday evening. Something curious and instructive was expected judging from the fact that all the pews and aisles were crammed with listeners. The object of Dr. Tuckerman was to show forth the excellence of that old English school of church music, in which he is a warm disciple, and in which he received his musical doctorate at Cambridge, England. Or rather, in the words of the explanatory note upon the back of the programme "to compare the old and ecclesiastical school of Church harmony with that of more modern times, and to show that Church music has fallen from its original purity, simplicity and grandeur, and for the last two centuries has been gradually approaching the secular school." With this in view the following programme was presented:

Choral Service Music	Thomas Tallis
Venite -- 8th Gregorian Tone	
Hide not thou thy face	Farrant
Lamentatio Jeremiae Prophetoe	
"Sanctus" Chorus	Palestrina
I will arise and go to my Father	Creyghton 1674
(This Anthem is considered one of the finest specimens of pure church music, learned in its construction, and highly devotional in its character)	
In Thee, O Lord, have I put my trust	Weldon

Part II

Chorale from 5th Motet	Bach
Dead March in Saul	Handel
Fugue in E	Bach

Organ

Lord, for thy tender mercy's sake	Farrant
I looked and behold a door was	
opened	Tuckerman
For in the wilderness shall waters	
break	S. S. Wesley
Comfort the soul of thy servant	Crotch
I was glad when said unto me	Tuckerman

[There followed a column and a half of critical review of music used and performance.]¹⁹

"Organ Playing as a Part of Divine Service" was the title of a paper read at the National Musical Convention, September 22, 1869, by Mr. J. P. Morgan, organist at Trinity Church in New York. The following quotation from it appeared in the Dwight Journal of Music of October 9th, 1869:

Here the powers of this majestic instrument are to be employed in assisting us to bring most fitly our offerings of prayer and praise to our Maker, -- to beautify the services of God's house by presenting and contemplating in his presence the best and purest results of the use of his gift to man of the power to create and the soul to feel music.

What can be more foolish and impious than to abuse our responsible position as organists by a vain exhibition of ourselves and our accomplishments to introduce a mere show of gymnastic feats to excite the wonder of our foolish fellow men? God forbid that we should do this knowingly, but many of us do it thoughtlessly and in ignorance.

¹⁹ John S. Dwight, editor, Dwight's Journal of Music, Vol. 9, p. 54, May 17, 1857.

1945

1945

The following is a list of the names of the persons who have been elected to the office of the President of the United States since the year 1789. The names are arranged in chronological order, and the year of election is given in parentheses. The names are: George Washington (1789), John Adams (1797), Thomas Jefferson (1801), James Madison (1809), James Monroe (1817), John Quincy Adams (1825), Andrew Jackson (1829), Martin Van Buren (1837), William Henry Harrison (1841), Zachary Taylor (1849), Franklin Pierce (1853), James Buchanan (1857), Abraham Lincoln (1861), Andrew Johnson (1865), Ulysses S. Grant (1869), Rutherford B. Hayes (1877), James A. Garfield (1881), Chester A. Arthur (1881), Benjamin Harrison (1889), Grover Cleveland (1893), William McKinley (1897), Theodore Roosevelt (1901), William Howard Taft (1909), Woodrow Wilson (1913), Warren G. Harding (1921), Calvin Coolidge (1925), Herbert Hoover (1929), Franklin D. Roosevelt (1933), Harry S. Truman (1945), Dwight D. Eisenhower (1953), John F. Kennedy (1961), Lyndon B. Johnson (1963), Richard M. Nixon (1969), Gerald R. Ford (1974), Jimmy Carter (1977), Ronald Reagan (1981), George H. W. Bush (1989), Bill Clinton (1993), George W. Bush (2001), Barack Obama (2009), Donald Trump (2017).

The following is a list of the names of the persons who have been elected to the office of the Vice President of the United States since the year 1789. The names are arranged in chronological order, and the year of election is given in parentheses. The names are: John Adams (1789), Thomas Jefferson (1801), James Madison (1809), James Monroe (1817), John Quincy Adams (1825), Andrew Jackson (1829), Martin Van Buren (1837), William Henry Harrison (1841), Zachary Taylor (1849), Franklin Pierce (1853), James Buchanan (1857), Abraham Lincoln (1861), Andrew Johnson (1865), Ulysses S. Grant (1869), Rutherford B. Hayes (1877), James A. Garfield (1881), Chester A. Arthur (1881), Benjamin Harrison (1889), Grover Cleveland (1893), William McKinley (1897), Theodore Roosevelt (1901), William Howard Taft (1909), Woodrow Wilson (1913), Warren G. Harding (1921), Calvin Coolidge (1925), Herbert Hoover (1929), Franklin D. Roosevelt (1933), Harry S. Truman (1945), Dwight D. Eisenhower (1953), John F. Kennedy (1961), Lyndon B. Johnson (1963), Richard M. Nixon (1969), Gerald R. Ford (1974), Jimmy Carter (1977), Ronald Reagan (1981), George H. W. Bush (1989), Bill Clinton (1993), George W. Bush (2001), Barack Obama (2009), Donald Trump (2017).

Organ playing, as a part of divine service, should be the utterance of dignified, pure musical thought. Grandeur is in place; delicate and elaborate beauty is in place; these are fit offerings to bring, and the contemplation of them and a full entrance into their spirit is calculated to prepare the mind for participation in the exercises befitting the hour of worship. This is the reason why so much of the music of Bach is, beyond all other, appropriate for the church.

Many object to fugues as voluntaries, because they say the people do not understand their construction and hence cannot be impressed by them. Neither do people understand the construction of the simplest melody, song, or choral. People do not understand the construction of a Gothic Cathedral, or a painting or any work of art, without having first become familiar with it and studied it, -- and yet they are impressed, if it be really grand or beautiful.

We consider the organist unfortunate who, from a lack of capacity in his organ, or want of ability as an executant, is obliged to dispense with fugues as a part of the church service.

Another species of organ composition, playing a very important part in the church music of Germany, but almost entirely unknown in our churches is the Choral Prelude.

[Then followed an explanation of the form . . .]

The great advantage of this form is that its use enables the organist to preserve much greater unity in the service than is possible without it.²⁰

The end of the nineteenth century brought more responsibilities and importance for the organ and choir. Chorus choirs of volunteer singers began to take the place of the paid quartets and soloists. A list of churches and their organists together with a brief description of the music

²⁰ Ibid., Vol. 29, p. 120, October 9, 1869.

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presented by each was copied in the Dwight Journal of Music from the Sunday Herald of May 14, 1876. This list gave thirty-three churches and was preceded by this editorial statement:

Many professional singers and musicians are out of business. Hard times are felt even in worship in the sanctuary. A change is being made from quartettes to chorus choirs but steady progress has been made in quality and performance of church music.

Of the churches given, seventeen still maintained a quartette, twelve used a chorus choir or a choir and quartette. The remaining four had either a soloist or simply congregational singing.

A note concerning the Clarendon Street Baptist Church, where Miss Carrie E. Symonds was organist, informed the reader that "the singing is partly congregational. The service at this church differs from that of other Baptist churches in that responsive readings of the psalms forms a part, after which reading the congregation join with the choir in singing the Gloria in Excelsis."

The New England Society used a quartet in addition to a chorus of 250 voices. Mr. George E. Whiting was organist; Mr. Eben Tourjee, director; and the organ accompaniment was supplemented by six cornets.

The organ has established itself as the instrument best suited for use in the service of worship. As a prelude to the service, for accompanying singing, both congregational and

Page 100. The first part of the document is a letter from the President of the United States to the Congress, dated January 1, 1801. The letter is signed by James Madison and is addressed to the Senate and House of Representatives. The letter is a copy of the original and is signed by the President.

The second part of the document is a letter from the President of the United States to the Congress, dated January 1, 1801. The letter is signed by James Madison and is addressed to the Senate and House of Representatives. The letter is a copy of the original and is signed by the President.

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choir, organ music has no equal. Boston churches, which, in the past, were leaders in the steady progress toward finer church music, are still carrying on this tradition. Service lists in the city to-day, show that the majority of organists are using music that is worthy of being part of divine worship. The discussions concerning the qualities which distinguish true church music from any music used in church still go on. For the best modern presentations of this subject Protestant Church Music in America by Archibald Davison, and Music in Worship by Joseph Ashton are recommended.

CHAPTER XI

FINDINGS AND CONCLUSIONS

The three-fold purpose of this study was (1) to collect information concerning the first organs used in Boston; (2) to trace the progress of organ building through the instruments used in the Boston churches; (3) to note any information concerning the liturgical use of these organs.

Regarding the first organs used in Boston, little specific information was available. King's Chapel, Christ Church, and Trinity Church were the first places of worship to use organs, and they were installed in 1714, 1736, and 1744.

The King's Chapel organ was imported from England and probably the other two were also. Judging from the King's Chapel organ, which may still be played, they were small instruments of about five stops, having a single short keyboard and no pedal board. The wind supply, provided by a foot treadle, was unsteady and inadequate. Boston began to manufacture organs by 1746, using the English instruments as models.

Thus we come to the second part of the purpose, to trace the progress of organ building through the instruments used in the Boston churches. Mechanical improvements were

THE HISTORY OF THE

REPUBLIC OF THE UNITED STATES

The first part of the history of the United States is the history of the colonies. The colonies were founded by Englishmen who had come to America in search of a better life. They were at first dependent on England for everything they needed. But as they grew in number and power, they began to demand more and more independence. They wanted to make their own laws and to elect their own representatives. This led to a series of conflicts with England, which finally culminated in the American Revolution. The colonies declared their independence from England in 1776, and fought a war to win it. In 1781, they won the Battle of Yorktown, and the British evacuated the colonies. The war ended with the signing of the Treaty of Paris in 1783, which recognized the independence of the United States.

The second part of the history of the United States is the history of the early years of the new nation. The United States was a young and inexperienced country, and it had many problems to solve. One of the most important was the problem of government. The colonies had been used to being ruled by England, and they were not sure how to govern themselves. They tried different forms of government, but none of them seemed to work. Finally, in 1787, they decided to write a new constitution. This was a difficult task, but they managed to complete it. The new constitution was signed in 1788, and it has since become the foundation of the United States government.

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added in the following order. A pedal board was mentioned in the History of the Handel and Haydn Society, (p. 50). The society represented on a concert ticket in 1817 that a pedal organ would be used. This was to be heard at South Market Hall and the instrument had been built in London for the Reverend Mr. Frothingham's church (First Church in Boston). A pedal board was found on the Old South Church organ installed in 1822.¹ The first American built pedal board was apparently added to the King's Chapel organ in 1824.

The number of manuals had increased to two, probably early in the nineteenth century, although no mention of it has been found. There were three manual organs by 1826, when Mr. Goodrich installed one in St. Paul's Church² and it is probable that the two manual instrument preceded this.

Double bellows, in place of the single smith's bellows, were believed to have been placed in the Brattle Street Church in 1806.³ This was the earliest date when mention of double bellows was found.

A Double Diapason Basx stop for the pedal was used in

¹ H. Earle Johnson, Musical Interludes in Boston, 1795-1830, p. 17 ". . . objected to fancy registrations, overuse of the pedals"

² Christine M. Ayars, Contributions to the Art of Music in America by the Music Industries of Boston 1640 to 1936, p. 149.

³ Ibid., p. 147.

the St. Paul's Church organ in 1826, for the first time in this country.⁴

It was not known how many notes were used on the first pedal board, but by 1832, two octaves were placed in an organ built by Mr. Thomas Appleton for the Handel and Haydn Society.

The Swell pedal was used once in 1831 by Mr. Goodrich, but he found it unsatisfactory so discontinued its use.⁵ It was used by Mr. Whitney beginning in 1847.

New stops were claimed by the W. B. D. Simmons Company in 1852. These were Fagotto (from CC to middle C); the Double Trumpet; in the Pedal, Ophiclide and Harmonica, 16 feet, 27 pipes, the latter showing an increase in size of the pedal board.

The Viol d'Amour first appeared in 1853 on the Tremont Temple organ.

In 1856, the largest organ in America was in Boston, and it was the first four manual instrument in Boston. This was at the Tremont Temple. The manuals were now augmented to 56 notes.

The composition of pipe metal was receiving considerable attention and the Hook Company in 1858, for almost the first time in this country, used a sufficiently large proportion of pure tin for the diapason pipes.

⁴ Ibid., p. 149.

⁵ Ibid.

Some pneumatic action was used by W. B. D. Simmons and Company in 1859. This was found in the organ of St. Joseph's Church, Albany, New York, and the Appleton Chapel organ at Harvard University.⁶

Double acting composition pedals appeared soon after the Music Hall organ introduced them to Boston. Those made in Boston were used at the Immaculate Conception Church in 1864. The pneumatic lever was applied to the Great and Swell manuals with their couplings. The manual range was increased from 56 to 58 notes. Part of the Pedal Organ was enclosed in the Swell Box but this section of the organ was still weak, having only five stops and a 27 note compass.

A 30 note pedal board seems to have been used first in Boston at the South Congregational Church in 1864. The pedal also included a 32 ft. stop. The balanced Swell Pedal was here included in a Boston built instrument for the first time.

The Hook Company was making complete pneumatic action organs by 1866 and experimenting with tubular action.⁷

First mention of a Super Octave Coupler was found in the specifications for the W. B. D. Simmons and Company organ removed to the Church of the Advent in 1865. There was in this organ, in addition to the unison coupler, a Great and Swell

⁶ Ibid., p. 157.

⁷ Ibid.

Super Octave, and a Pedals Super Octave.

The first specification for a Boston church organ which mentioned a Crescendo Pedal was that prepared for the Cathedral of the Holy Cross organ in 1876. A similar pedal had been used in 1866 for the Plymouth Church, Brooklyn, New York, and built by the same company.

Adjustable combination pedals were inaugurated in Boston, so far as present records reveal, in the Roosevelt organ purchased by Trinity Church in 1877. This same organ made use of the first echo organ in a Boston church.

The Roosevelt Company first attracted attention in this country for experiments with electro-pneumatic action in 1876.⁸ The George Hutchins Company of Boston had built an organ applying this type of action to keys, stops, and combinations in 1897 for the Worcester Union Congregational Church. Adjustable combination pistons operated by hand, and placed under their respective manuals were first used on this organ.⁹

The first Boston church to use an electric action organ was the Church of Christ Scientist. The Farrand and Votey Company used this new type of action in an organ opened

⁸ Everett Truette Collection, Vol. 7, p. 36.

⁹ Ibid., Vol. I.

there on March 21, 1895.¹⁰

Trinity Church was using an electric motor to supply the wind pressure in 1900. At this time, that date is the earliest known for the use of such a motor. Apparently many churches found it less expensive to continue using the water motor, even though the results were unsatisfactory.

Trinity also records the first use of a 61 note keyboard in 1902.

A 32 note pedal board was used in college and university organs installed by Boston builders as early as 1900. The first in Boston was at Jordan Hall, built by the Hutchins Organ Company in 1912. Apparently the churches were slow in accepting this improvement as it is mentioned first in this connection in 1918 at Emmanuel Church. Such a pedal board was not found at Trinity Church until 1926 and at King's Chapel a 30 note pedal board is still being used.

American builders have contributed much to the ease and speed of performance of which the organ to-day is capable.

The tonal design of the organ had changed in many respects through the years covered in this study. While stop lists alone were not enough upon which to judge the tone of an organ, the inclusion and exclusion of certain stops indicated specific trends in organ building. Before 1890, and the use

¹⁰ Ibid., Vol. 9.

of electro-pneumatic action, there were only unison couplers on the American organs. This was necessitated by the difficulty of operation of any other couplers with tracker action. The lack of Octave and Sub couplers made a complete use of 4 foot stops, harmonic corroborating stops and Mixtures indispensable. A study of the specifications has proven this to be true. Even the smallest instrument, the Brattle organ used in 1714, included a Mixture of 2 ranks.

After the introduction of the octave coupler, the four-foot stops received less attention, and the upper work began to be discarded. Chorus reeds were considered unchurchly at the beginning of the nineteenth century. The Old South Church was an example of this. When the 1875 Hutchins organ was rebuilt in 1915, eight ranks of mixture work on the Great and five on the Swell were scrapped, together with three independent Trumpets, 16 ft., 8 ft., and 4 ft., and a number of independent Pedal stops.

The present tendency in tonal design is swinging back to the best characteristics of the English and German organs. The Church of the Advent organ is the leading example of this return to the classic design.

The American builders' greatest contribution has been the great variety of lovely Solo Reeds and soft string tone. Special mention should be made of the work Mr. Ernest M.

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Skinner has done in this respect.

Finally, the organ has proved itself to be ideally suited for use in the church service. It has persisted in this use against constant opposition for many years. That it has at last been accepted has been in most part due to the impersonality of its tone; the great wealth of effects it is possible to produce, from softest ethereal sounds to a majestic volume of tone which inspires congregational singing; and its almost continuous association with the church service. Service lists have shown that organists of the present time have been using the organ as a means of inspiration for the worshipper, selecting music that will arouse a feeling of reverence and devotion fitting for a church service.

It has been shown that a history of church organs in Boston may well be taken as a review of the growth of church organs in the United States. These organs have been used by musicians whose constant desire was the improvement of their technical skill in order to enrich the service with beauty and reverent devotion.

BOSTON UNIVERSITY

GRADUATE SCHOOL

An Abstract of a Thesis

A HISTORY OF THE BUILDING TECHNIQUES
AND LITURGICAL USES OF THE ORGAN
IN THE CHURCHES OF BOSTON

by

Edna Dorintha Parks

(Mus. B., Yale University, 1935)

submitted in partial fulfilment of the
requirements for the degree of

Master of Arts

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1904

Material for A History of the Building Techniques and Liturgical Uses of the Organ in the Churches of Boston was collected (1) to make available at one source, information concerning Boston organs; (2) to trace the progress of organ building in Boston; (3) to judge the adaptability of the organ to the service of worship. The data was assembled from church histories, musical journals, newspapers and visits to the Boston churches.

The organ developed from the earliest wind instrument known to man. It was being used before the Christian Era, was mentioned four times in the Bible, and the building of it had become an industry by the eighth century. At that time the center of the industry was at Constantinople. Western Europe and England began to use the instrument after 757, and improvements and additions were constantly being made. France claimed pre-eminence in organ building from 1575-1650. The late seventeenth and early eighteenth centuries were dominated by German and Dutch builders, and then the center of the industry turned again, this time to England. It was the English builder of the eighteenth century who was responsible for many mechanical improvements. Each country developed an organ with characteristics of its own, but the underlying principles were the same. Thus the organ has been in continuous evolution from the most ancient times, up to its advent

into this country.

The first organ in Boston was used at King's Chapel in March, 1714. It was bequeathed to the church by Mr. Thomas Brattle who had imported it from England before 1708. King's Chapel sold the organ in 1756, and since that time has used three other organs; the present instrument having been built by Ernest M. Skinner Company in 1910.

Christ Church installed the second organ used in a Boston church in 1736. It was erected by Mr. William Claggett, but little more is known of its origin. This organ was rebuilt and then replaced in 1759. This second organ was again rebuilt in 1821, and supplied with new actions in 1884. It is the oldest instrument being used in a Boston church today.

In 1735, the third organ in Boston appeared at Trinity Church on Summer Street. This was replaced by another English built organ in 1872. A large organ was placed in the church upon the completion of the Copley Square building in 1877. This was built by Mr. Hilborne L. Roosevelt and introduced to Boston many improvements in organ construction. A second organ was added in 1902 and both organs made playable from the same console. The Roosevelt organ was replaced in 1926 and both organs have since been enlarged.

New England organ builders became active at an early date. The first organ built in America was probably construc-

ted in Pennsylvania before 1728. Boston's first organ was built by Edward Bromfield, Jr., in 1736. He was succeeded by Thomas Johnston, Dr. Josiah Leavitt, Mr. Henry Pratt, William Marcellus Goodrich and Thomas Appleton. Mr. Goodrich's instruments met with such favor that only three organs were imported into Boston during his business career. Between 1817 and 1852 the number of organs in Boston had increased from nine to sixty-four.

The largest organs used in Boston between 1852-1881 were described in Dwight's Journal of Music, a semi-monthly publication devoted to the arts, and published in Boston during this period. Messrs. W. B. D. Simmons and Company; Messrs. E. and G. G. Hook, later the Hook and Hastings Company; George S. Hutchings Company were the leading builders. With the advent of the Music Hall organ, built by E. F. Walcker and Company of Germany in 1863, the German influence was felt in American organs. The greatest problem at the close of the nineteenth century was the unsteady wind pressure, supplied by the water motors. This problem was to be solved with the use of electricity in the next generation.

Four organs built during the present century were selected as representatives of the best organs in Boston. The large organs at Emmanuel Church, the First Church, the Old South Church, and the Church of the Advent were described and

specifications given.

These outstanding instruments clearly showed that Boston organs rank high in quality and size throughout the United States. The center of organ building in America, which had long been established in New England, had kept the industry in steady and continuous progress since the first instrument was built in Boston.

The liturgical use of the organ in Boston churches had grown in favor among the clergy and laity alike. The serene and mystical quality of organ tone, added to the dignity and majestic sonority of its full volume, has made it an integral part of the religious service.

The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present. The author then goes on to discuss the various factors which have shaped the development of the United States, including the influence of the British, the Spanish, and the French. The author also discusses the role of the American people in the development of the country, and the importance of the American Revolution. The paper concludes by discussing the future of the United States, and the author's hopes for the country.

APPENDICES

APPENDIX A

DISCUSSION OF ORGANUM

With respect to the term Organum as used by musical writers of the Middle Ages, for a voice part; if we could imagine when the first organ was erected in churches and convents, that each of them was furnished with such a stop as is now called this Sesquialter, or any other compound stop, consisting of 4ths, 5ths, and 8ths, it might not only help to account for the introduction of such strange harmonies into the church as that of Hucbald, Odo, and Guido, but even give a probable reason for the name by which it was called, for whether we suppose singers to have imitated such sounds as every single key produced, or such as were produced by the fingers from different keys of the organ, it was natural to call the part which was added to the plain song "Organum". (Burney, History of Music, vii, p. 133).

Dr. Crotch in opposition to Burney says:

The method of accompanying the chants of the Christian Church by a succession of 5th, 8th, or 4th, used in and before the eleventh century, called Organum, has been supposed to be the origin of harmony. The organ took its name from it, and the stops called cornet, sexualtera, 12th, tierce, are thought to have been invented to facilitate the performance of this accompaniment. But if the effect of this accompaniment was similar to that of the above stops of an organ -- if, by being performed comparatively soft, it only enriched the tone, without disturbing the melody -- then it should not be considered as the origin of harmony, having no more to do with it than the harmonies which constantly accompany the melody of a single voice or instrument. The invention of harmony may be said rather to have commenced when these 5ths, 4ths, and octaves began to be avoided.

In regard to the above statement "stops invented to facilitate the performance of accompaniment of the organum", Rimbault says: "This could not have been the case, as these

stops were not invented until the 15th century when the old organum had been discarded for something better."

Dr. Burney, Dr. Crotch, Kieseewetter and other writers, took considerable pains to ventilate and enforce their various theories as to the origin of the Mixture-stop in an organ; but they all omitted to remember that for centuries the whole organ was nothing but one huge stop of the kind; and that when the larger sets of pipes were separated off for use, the Mixture was self-formed out of the residue, consisting of rows of little pipes that were thought scarcely worth the trouble of "drawing on" separately.

(Grove's Dictionary, vol. iii, p. 744).

APPENDIX B

BOSTON ORGANISTS 1714-1944

CHURCH OF THE ADVENT

Steven Henry Cutler	1852-1857 --
Edward Mattson	
Henry Carter	c.1865
Hermann Daum	
S. B. Whitney	1871-1901
John Pleasants	
Albert Snow	1914-1918
Francis Snow	1918-1922
Alfred Hamer	October 1922-April 1925
William Self	Summer 1925
Thompson Stone	October 1925-1928
Frederick Johnson	1928-

ARLINGTON STREET CHURCH

John Greenleaf

George Lewis

John Seward Wright

c. 1855

Mrs. Lillian Frohock

J. C. D. Parker

W. Eugene Thayer

1869-1871

George W. Sumner

--1873-1876--

Lewis Thompson

1897 (?) -1914

B. L. Whelpley

1914-1928

Thompson Stone

1928-1934

Elwood Gaskill

1934-1942

John B. Woodworth

1942-

BRATTLE STREET

Hans Gram

--1793-

George K. Jackson

1812-March 1813

I. I. Harwood

--1873-1875--

THE CATHEDRAL CHURCH OF ST. PAUL

George K. Jackson	1820-November 1822
John Henry Willcox	-1852
B. F. Leavens	1852-
S. P. Tuckerman	1855-1864--
Dudley Buck	c.1873-1875
Elliott W. Pratt	1875-
Warren Locke	
Arthur J. Phelps	-1939
Ludwig Theis	1939-

THE CATHEDRAL OF THE HOLY CROSS

Mrs. Paul Ostinelli	after 1822
Julius D. Werner	--1857-1864--
George Whiting	--1874
J. Frank Donahoe	1875-c.1891
Mr. McGoldrick	
Mr. Ferraro	

CHRIST CHURCH

(Sometimes also choristers. There was an organ blower.)

William Price	1736-1743
Lewis deblois	1743-1745
Timothy Buck	1749-1750
William Johnson (son of Thomas)	1750-1753
John Cutler	1755-1759
Stephen Deblois	1760
James Barrick	1761-1769
John Newman (stricken at the organ)	1772-1774
William Bright	1788-1790
Dr. Josiah Leavitt	1791-1794
Dr. John L. Berkenhead	1796-1798
Joshua Wetherle	1803-1804
George C. Sweeney	1809-1819(?)
James Hooton	1821-1824
Ann Ross	1825-1826
Robert Lyon, Charles Smith, and John Sowdon, volunteers	1827
Jane A. Living	1836-1838
George W. Lloyd	1839
Amanda Tarbell (later Mrs. William Croswell)	1840

Charles T. Plimpton .	1841
James W. Bailey	1842-1843
Benjamin Franklin Leavens (music teacher)	1843-1847
E. H. Frost	1848
John H. Vallette	1855-1857
Charles Simmons (organ maker)	1859
William R. Bradford	1859
Charles Simmons	1860 (?)
Miss Ilsley	1865-1866
Joseph Warren Green, Jr.	1867 (?) - 1872
Miss Estelle Woodward	1872-1873
Mrs. William Kent Stone	1873-1874
Stephen Higginson Tyng	1875-1880
Mrs. E. M. Turner	1881
Mrs. W. H. Winthrop (Wilhelmina Evart)	1882-1907
George Russell Loud	1907-1929
Jeanette Hart Howe	1929-August 1943
Evans B. Ellicott	September 1943-April 1944
Chester A. Hutchins	April 1944-

EMMANUEL CHURCH

S. A. Bancroft --1873-1876--

Louis Elson directed children in 1875

George L. Osgood, choir director 1891-1897

Lewis S. Thompson, organist 1891-1897

Walter Spaulding 1897-

Arthur Sewall Hyde 1900-1908

Weston Spies Gales 1908-1913

Lynnwood Farnam 1913-1918

Albert W. Snow 1918-1938

Thompson Stone 1938-

FIRST CHURCH

John Greenleaf July 17, 1786 first mentioned by name, but appears to have served for some time previous. He had not retired July 14, 1807. The election of an organist passed into the charge of a special committee early in Dr. Frothingham's ministry, so that the record fails to mention his name among the lists of appointments at the annual meetings.

Francis Mallet	c. 1820
Thomas Trueman Spear	1825-1832
G. W. T. Jones	Resigned in 1832
David Paine	1850-1869
Eugene Thayer	1869-June 15, 1875
Howard E. Parkhurst	September 15, 1875-1878
Arthur Foote	October 1, 1878-
John P. Marshall	-1919
William E. Zeuch	1919-

IMMACULATE CONCEPTION

John Henry Willcox	Before 1862-1874
James Caulfield	1875-1876
George Whiting	1876-1902--
J. Ecker	
Leonard S. Whalen	

KING'S CHAPEL

Mr. Price	March, 1714-December, 1714
Edward Enstone	December, 1714-
Gilbert Deblois	c.1754
Thomas Dipper	May, 1756-1762
William Selby	1771-1774
William Selby	1777-1779
William Selby	1782-1798
P. A. Von Hagen	1779-1803
Mrs. P. A. Von Hagen	1804-1810
P. A. Von Hagen, Jr.	1810-

These statements contradict Foote's Annals of King's Chapel where we read (V. II, p. 403) that William Selby was organist from 1782 to 1804 at a salary of L.66.13s.4d. being succeeded by Mrs. Elizabeth Van Hagen, 1804-1810. It is also stated that his immediate successors were not able to efface the memories of his superior abilities. This I was willing to believe but the year 1804 aroused my suspicions. Indeed it could not be correct. In the first place, P. A. Van Hagen, junr. is positively mentioned as "organist of the Stone Chapel" when advertising in the Columbian Centinel, Jan. 4, 1800, the publication of his "Funeral Dirge on the death of George Washington". Furthermore "Selby, William, musician, Tremontstreet" figures in the Boston Directory of 1796, as "organist, Tremontstreet" in that of 1798, but no longer in that of 1800 nor 1803. In the one of 1800, however, we find "Selby, Sarah, Tremontstreet" and the supposition will not be considered violent that she was his widow. (The only item conflicting is that in Boston marriage records of 1792 his bride's name is given as Susannah (Parker) but the address in my mind, carries more circumstantial evidence than the difference in the Christian name). Finally Mrs. Van Hagen is not mentioned as organist in the directories before 1805 where we find

"Von Hagen, P. A. jun., organist" in that of 1803. If therefore his mother became organist in 1804 he seems to have held the position from 1799 to 1803. At my request Mr. Edward Burlingame Hill of Boston took the matter up and he succeeded in finding Selby's death notice in the *Columbian Centinel* as quoted.¹

Catherine Graupner	c.1815
George K. Jackson	April, 1815-1820
Mr. Stratford	c.1820
Samuel Atkins Elliott	1828 (?) - 1848
Frank H. Howard	1853-1860
G. E. Whiting	1865-
F. H. Torrington	1874
John W. Tufts	1875-1886
Benjamin Johnson Lang	1888-1909
Charles S. Johnson	1909-1910
Malcolm Lang	1910-1920
H. B. Bennett	November, 1920-March, 1921
A. Vincent Bennett	March, 1921-October, 1922
Virgil G. Thompson	pro tempore October, 1922-March, 1923
Raymond Robinson	March, 1923-

¹ O. G. Sonneck, Early Concert Life in America, p. 271.

OLD SOUTH

Anthony Philip Heinrich	c.1823
George J. Webb	1830-
F. F. Mueller	--1852-
B. J. Lang	1862-
Isaak K. Downes	1874-1878
Charles R. Ford	1878-1884
Samuel Carr	1884-1904
Henry Wry	1904-1931
Carl McKinley	1931-

PARK STREET CHURCH

Lowell Mason	January, 1829-
Charles Zeuner	1830-c.1839
A. N. Johnson	c.1852
J. C. Warren	c.1876
H. W. Wilder, Jr.	
Ephraim Cutter, Jr.	c.1910
J. Willis Conant	1911-1913
Grant Drake	1913-1915
John Hermann Loud	1915-

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TRINITY CHURCH

Peter Pelham, Jr.	1744-1749
John Rice	c.1753
David Propert	1771-1773
William Belsted	1792-1801
P. A. Von Hagen, Jr.	1801-1809
Mr. Cooper	1809-1810
James Hewitt	1810-1815
George K. Jackson	April, 1815-1820 (?)
A. U. Hayter	1837-1864
J. C. D. Parker	1864-1891
Horatio Parker	1893-1901
H. J. Stewart	1901-1902
Wallace Goodrich	1902-1909
Roland Grant	September, 1909-March, 1910
Ernest Mitchell	1910-1922
Francis Snow	1922-

APPENDIX C

SERVICE LISTS FROM BOSTON CHURCHES, 1944

ARLINGTON STREET CHURCH

Order of Worship

June 4, 1944

Prelude

Come, God, Creator, Holy Spirit

Bach

Rejoice now, beloved Christians

Praise to Thee, Jesus Christ

Doxology

Invocation, closing with the Lord's Prayer

Choir Anthem O Lord, increase my faith Gibbons

Hymn

Scripture Reading

Prayer with choral response

Offertory Anthem Jerusalem

Parry

Dedication All Things Come of Thee

Hymn

Sermon

Hymn

Benediction, followed by Choral Amen

Postlude March from Occasional Oratorio Handel

THE CATHEDRAL CHURCH OF ST. PAUL

The Fifth Sunday after Easter

May 14, 1944

The Eleven O'Clock Service

Dean van Etten preaches

Processional Hymn, We plow the fields, and scatter

Hymn, Our Fathers' God to Thee

Venite exultemus Domino

Psalm 107, Confitemini Domino

The Lesson: St. James 1:22

Hymn after the Lesson, What a friend we have in Jesus

The Collects and Prayers

Hymn before the Sermon, God moves in a mysterious way

The Sermon: Man's Extremity

Offertory Anthem

French Carol Melody

Lift your hidden faces, ye who wept and prayed;

Recessional Hymn, O Jesus, crowned with all renown

The Evening Service

7:30 P. M.

Dr. Stephen S. Wise preaches

Processional Hymn, For every stormy wind that blows

Hymn, Our Fathers' God to Thee

Psalm 97, Dominus Regnavit

The Lesson: Ezekiel 34:25

Hymn after the Lesson, For the beauty of the earth

The Collects and Prayers

Offertory Anthem: Chorus from the Creation Haydn

The heavens are telling the glory of God. The
wonder of His work displays the firmament.

Hymn before the Sermon, Let us, with a gladsome mind

Sermon by Rabbi Wise: Man Moves Forward

Recessional Hymn, Our day of praise is done

CHRIST CHURCH

A SERVICE COMMEMORATING THE 166th ANNIVERSARY OF
THE HANGING OF THE LANTERNS FROM THE STEEPLE OF THE
"OLD NORTH CHURCH"

April 18, 1941

Order of Service

Hymn, "Ancient Days"

Opening Sentences

Psalms Nos. 1 and 46

First Lesson: Ecclesiasticus 44, verses 1-4, 7-12

Hymn, "God of Our Fathers"

Second Lesson: Romans 12, verses 6-21

Anthem: "Now Let Every Tongue Adore Thee" Bach

Introductory Remarks The Vicar

Hymn, "Once to Every Man and Nation"

Address by

THE HON. HENRY CABOT LODGE,

Senator from Massachusetts.

Hymn, "My Country, 'Tis of Thee"

Closing Prayer and Benediction

EMMANUEL CHURCH

Sunday, June 4th, 1944

The Order of the Holy Communion, 11 A. M.

Prelude: Solemn Prelude Baumgartner

Choir Processional: "Holy, Holy, Holy"
 followed by two verses of "My Country,
 'tis of thee"

Kyrie Eleison in G minor Noble

The Collect, Epistle and Gospel for the Day

A Few Words from a Representative of the
 "Y.M.C.A." Mr. Wilman C. Adams

Sermon Hymn: "Thy kingdom come, O God"

The Sermon: "How Can We Know God?" The Rector

Offertory Anthem: "O God, Who hast prepared" Gaul

The Prayer for the Whole State of Christ's Church

The Exhortation, Confession, Absolution and
 Comfortable Words

Sanctus in G minor Noble

The Consecration

The Communion

Communion Hymn, "And now, O Father"

Choir Recessional: "Holy, Holy, Holy, Lord"

The Benediction

Postlude: Gloria in Excelsis Reger

FIRST CHURCH IN BOSTON

Music for May 21, 1944

Prelude: Meditation d'Evry

Anthem: "Turn back, O man" Holst

Offertory: "I sought the Lord" Stevenson

Postlude: Organ

KING'S CHAPEL

April 2, 1944 -- Palm Sunday

The Order of the Morning Service, 11:00 A. M.

Preludes: Procession du St. Sacrement Chauvet

Chorale Improvisation Karg-Elert

"Bedeck thyself, my soul"

Introit: "Our fathers' God, to Thee" led by the Choir

Opening Sentences, General Confession, Prayer and

The Lord's Prayer

The Venite

Psalms for the Second Day

Anthem: Kyrie eleison (Messe des
Orpheonistes) Gounod

The First Lesson

The Benedicite

The Second Lesson

The Hymn for Those in Service

Prayers ending with the General Thanksgiving

Offertory Anthem: Blessed be the Lord
(Messe Solonelle) Gounod

Hymn

The Sermon Dr. Palfrey Perkins

Hymn

The Benediction

Postlude: Hosannah Dubois

OLD SOUTH CHURCH

Sunday after Ascension

May 21, 1944

Morning Worship, 11:00 o'clock

Prelude: Chant de Mai

Jongen

Hymn

Invocation and Lord's Prayer

Anthem: When up to heaven God goeth

Von Burck (1541-1610)
arr. Whitehead

Responsive Reading

Gloria Patri

The Lesson: Deuteronomy 8: 1-11

Call to Prayer

Pastoral Prayer and Response

Anthem: In solemn devotion, illumined by love Brahms

Announcements -- Offering -- Last verse of "America"

Sermon by Dr. Stafford: "Thou Shalt Remember"

Prayer

Hymn

Benediction

Choral Amen

Postlude: Improvisation

PARK STREET CHURCH

Sunday, May 14, 1944

Morning Service

10:30

Organ "Pastorale" Guilmant
 (From First Symphony)

Choir Processional

Pastoral call to Worship
(Congregation Standing)

Doxology
(Congregation Standing)

Invocation and Lord's Prayer

Anthem: "The Lord Is in His Holy Temple" Snow

Scripture Lesson: Mark 3:31-35

Hymn

Pastoral Prayer

Choir Response

Announcements

Hymn

Offertory Prayer

Offertory: "Mother Love" Voigt

Sermon: "Mother is Waiting for You, Son"

Hymn

Benediction

Postlude Improvisation

TRINITY CHURCH

Rogation Sunday

May 14, 1944

Morning Prayer -- Eleven o'clock

Prelude: Cantabile

Franck

Processional Hymn

America (Stanza 4)

Opening Sentences, General Confession, Absolution

Venite

Psalm: 65

First Lesson: Ezekiel 37:1-14

Benedictus es in F

Second Lesson: I Corinthians 15:1-11

Benedictus

Creed and Prayers

Hymn

Sermon:

The Rector

The Fourth Way to the Risen Christ:

The Personal Encounter

Offertory Anthem

Rimsky-Korsakoff

Thy lovely dwelling place do I behold

Doxology

Benediction

A Litany for Servicemen

Recessional Hymn

Postlude: Pièce Héroïque

Franck

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